

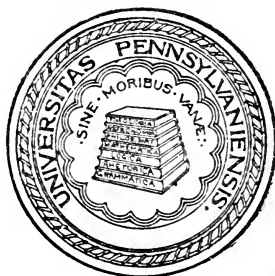
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ADDRESSES BY THE PROVOST AT THE BEGINNING OF THE NEW
ACADEMIC YEAR.

At the Opening of the College, September 29, 1899.

Students of the College :—

It is not an easy thing to speak to you. It might be, it is true, if the occasion of to-day were to end with to-day. It might be, if so much did not hang upon to-day and the days which are to follow. It would be, if what I wish to say to you came entirely from a careless heart, and if I did not feel possessed with the responsibility of your future.

I may look into your faces—eager with expectation and purpose and hope, upon whose lineaments neither joy nor sorrow, success nor failure, has as yet left its imperishable mark,—and try to foresee what is to be the lot and work of each of you; but no prophet nor oracle can satisfy, with any certain answer, the questions concerning you to which we would have reply.

Perhaps all that I can fairly ask is that you will truly believe that the few words with which I shall seek to open a new academic year will be words of sincerity and truthfulness.

During the long vacation, all of us must have had new experiences. To some, a growth of vigor and healthfulness and progress, from well-spent time. To others, some retrogression, which I believe comes necessarily to all, youth and adult as well, after a too long, careless and idle holiday. That is, my belief is that without either stimulating association or definite purpose, man everywhere relapses. But now, from every compass-point, during these last few days, both from our own land and from abroad, several thousand distinct and separate human

beings each one unlike the other, have been converging to one place—that where we now are—the University of Pennsylvania.

To more than one, since we parted in the summer, has one great change come; and of such we can only say that

“ Their part in all the pomp that fills
The circuit of the summer hills
Is that their grave is green.”

May they rest in certain hope!

And now let me say a few words about the new year. Whatever may have been your history during vacation time, there has been no rest at the University. Constant progress, ceaseless work and constant preparation have been the story of the passing days. Perhaps there has never been a time so rich in preparation, through the thoughtful provision of bountiful women and men. And you who are here before me to-day are the heirs not only of this present time; not only of this recent past, but of all the generations in the history of the University. If ever there were a group of young men surrounded by a “cloud of witnesses,” they are those who come to a university. Let me ask each one of you what he is going to do with his opportunities. When you are at your own home, you protect your own household and its fair fame, under all circumstances. When you are at the University, you have no less a responsibility—perhaps, a greater one. Are you to be a blot on the fair fame of this benign mother, or are you to be her loyal, devoted son, whose name she will always cherish?

Napoleon said that his use for men was as machines, to project against his enemies. Every college man has a chance of being a projectile. There is no one of you, with brains, who cannot be in his college years, and in the time to come, a man whom Carlyle called “one who could *do something*,” a “Canning” man,—that is one who can do; in other words, a *king*! When I look in the face of

any one of our students, after he shall have been graduated, the first thought that comes into my mind is: What is that man thinking about? As one of our poets has said: "Will the poverty of your speech betray you; or will its splendor mark you?" Or, as another has said: "Will you trust your wit to make your home pleasant to your friend; or will you, in default thereof, buy ice cream for his entertainment?" What, indeed, does it profit us—so many of us—if we work ourselves to death here for you; or, as St. Paul said, "What does it profit us to die daily" for you, and yet fail to turn out men! Shall you be bought, later on, in the market place, as President Jordan recently said, at so much *per dozen*; or will each one of you resolve, and highly resolve, to be a man. Recollect that "the names of men last, while the names of nations are forgotten!"

What you honorably bind yourselves to do when you come here, and what everyone has the right to expect of you, is honesty of work and honesty of personal conduct: and where can any greater stimulation lead to such purposes than at a university? You have not to travel a road of high purpose alone, as so many have done, and yet have reached the goal. The man who first rounded Cape Horn and turned the prow of his little vessel to cross the Pacific knew not whither he went; but he was determined to find out whither that long lane led—for the good of all—without regard to what befell himself. And the men who have so often illumined the whole age in which they lived have not seldom been those who have explored or studied or investigated—often in solitude, and oftener still in the face of contempt and ridicule. But you are here in a city—in the company of a host of masters and scholars,—if not all with the same special end, at least all with the same general aim, acting upon and reacting each upon the other; and the very atmosphere, here, is full of encouragement and stimulation!

Will I say too much, then, when I say to every young man here that we have the right to expect from him honest work for the day;—and we wish him, at the end of each day of honest work, honest hope for the morrow.

But there is another great aim and end in coming here, to which I would be derelict if I did not, in the most earnest way, call your attention. You do not come here for the selfish purpose of preparing yourselves to look out for yourselves. You come here for the distinct purpose of fitting yourselves all the better to be of service to humanity; and there is one direction in which that service opens itself just now in the largest way of duty and usefulness. I mean the political service, in the best sense of that word, which every university man should prepare himself to render. Begin early to take part in every movement which concerns our civic condition, and to do so intelligently. Study the framework of our own municipal government; precisely how it is conducted, from the earliest movement—which often is the most important—to the highest function of the city's government. Take a personal part in it as soon as you are able to cast a vote; and fear nothing, except acting from want of thought and knowledge, and telling a lie. It is often the well-earned reproach, not only of college men, but of the graduates of professional schools from universities, except that of law,—that they hold themselves aloof from matters which concern the public welfare. Begin early, and hammer away at it hard,—always courteously, and after careful study, and desiring not to have truth on your side as much as yourselves to be on the side of the truth.

Perhaps I have said too much to you; perhaps I have said what may seem to you impossible to perform; but there are many who have tried and have attained to just such a standard of the student-life. May each one of you be in this group!

And in such standards we are to discern the real elements

of greatness in humanity, as apart from the artificial and accidental conditions by which the world is too often dazzled and misled. "Plain living and high thinking" is distinctively an American phrase; but wherever the thing itself may be, we should be broad enough in our humanity to recognize it: and wherever it exists, under whatever nationality, it is that which is to be revered as the stratum up from which will come the men needed by the nation and the time!

Edinburgh is magnificent and charming, with its noble monuments, its vice-regal court, its ancient and well-authenticated history, its venerable university: Aberdeen is throned amid the fairest surroundings of nature, art and tradition, and its university is even more venerable. From these two we derive our academic and our medical lineage. But Edinburgh and Aberdeen cannot live on these alone: they would soon starve but for the far outlying farmlands, with their rude homesteads and homely occupations. Out of such are coming the young men and the young women of strong, healthy fibre, both of body and soul, who will find their place and do their work in the larger world, and leaven it with the wholesome life that seemed so lowly.

Out of one of these Scottish parishes there went a lad to win his "Master of Arts" degree, at the University of Aberdeen; and from there he came to Philadelphia, to be our first and greatest Provost, and with his splendid knowledge and fine classic taste to give that university's tone to the new College of Philadelphia. And the poor and rugged parish out of which he came may have had Drumtochty's lofty pride; that it never lacked one son, at least,—enduring even hardships of poverty, but winning perpetual laurels,—at the university.

And as we have this great example before us, so it remains in your power—and in ours, in lesser degree—to so conduct ourselves, while scholars and masters here, that the loftiest pride of village, town or city in our great Com-

monwealth and outside of it, may be that of the Scottish parish, that one at least of their sons may always be their representative at the University of Pennsylvania.

At the Opening of the Medical and Allied Schools.

Gentlemen of the Medical and Allied Schools:—

It has been usual during these recent years to address the students in medicine and its allied subjects upon the opening of a new academic year, and I do so at this time—as in the few years since I have been in the service of the University—with interest and pleasure.

Before proceeding, however, to the definite matter of my remarks, permit me to state the major professional changes which have been made in the medical teaching body. First, Dr. Tyson, hitherto Professor of Clinical Medicine, has been appointed Professor of the Theory and Practice of Medicine. The Chair of Clinical Medicine, recently held by Dr. Tyson, will, on account of the growing importance of the subject, be hereafter held by two men instead of one; and these two Professors of Clinical Medicine are now, as doubtless you will have known, Dr. Musser and Dr. Stengel. As this is the first announcement of the presence of old friends in advanced positions, I am sure you will join with me in according to them a welcome of respect and confidence.

The Professorship of Pathology, hitherto under the care of Dr. Guit  ras, has been filled—I am sure in the most complete sense of that word—by Dr. Simon Flexner. There remains, then, but one vacant chair, that of Gyn  cology, which Dr. Penrose was forced to vacate on account of his ill health. I feel quite sure that this vacancy will soon be closed.

In the few words which I shall have to say the subject to which I shall seek to draw your attention is the important part which you are to perform in the economy of nature, under the guidance of a Divine Power. Emerson

stated the question when he spoke of the "sublime and friendly destiny by which the human race is guided," and of the unceasing effort throughout nature for something better than the existing conditions. He referred to the population of the world as a "conditional population," not the best that may live, but the best that can live in the existing state of knowledge. To use his own words: "The best that could *yet* live: there shall be a better—please God!" The great end, then, to which you are to direct all your powers is the bringing about of better life conditions.

Perhaps one of the amazing things in the world is the limited interest in the physical life, the present basis of the intellectual and spiritual, which is taken by men and women themselves—by all of us who are most vitally concerned in it. Amongst western nations, even, there is, perhaps, more of the feeling of fatalism in questions of applied medical science than in any other great question. Every one knows that in the East the "Will of God," in matters of life and death, is accepted as final without any effort at human intervention. Recent travelers in Asia Minor, and a recent writer upon Armenia, speak of cities of thirty or forty thousand population where there is no effort to care for life. Families of ten or twelve children are, with practical regularity, reduced to three or four, and the result accepted with entire complacency. It has been, of course, better in the West; but I still think it a question upon which there has been the least intelligent interest. I feel, however, that the reason why so little public care or thought has been given to this subject is because attention has not been seriously called to it. It is a question to which the answer does not come of itself—one the details of which must be made clear to individuals; but with such patient representation I feel warranted in saying that, just as every other University need is being rapidly provided, so this great want of laboratories and research endowment

will also be provided. If the fruit-grower, whose orchard is invaded by the "San José scale," seeks, immediately, scientific help to stay or prevent; if the farmer so relies upon science for the care of his herds; certainly man will see to it that "the family" will have, through the universities, safe-guarding and immunity.

Huxley said that the wealth of England—and we may say the wealth of the United States—hangs upon the thread of applied science. This we all know to be true; but it is no less true that the wealth of life, and everything which concerns it, hangs upon the thread of applied science exactly as does material wealth. But has not the manufacturer given much more attention to the preciseness of his laboratory results, upon which the conduct of his business has to depend, than anyone does to the scientific knowledge of the man to whose art he entrusts his wife and children and himself? And so it is quite true that this lack of interest is revealed by the almost entire absence of any endowment for research in medical science. Almost every other conceivable thing attracts the benefactions of the rich. Hospitals are endowed, governments and municipalities make vast appropriations for expositions; astronomical observatories, elevating and stimulating and useful as they are, exist everywhere—but tell me the place in all these thousands of years of the world's history, until the solitary instances which have recently occurred, where the chiefest of the sciences has attracted the attention of benefactors!

(And since writing this last sentence I am very glad to be able to add that a sister university entertains the same view of the subject of which I am speaking; for in conferring recently an honorary degree upon Dr. Councilman the reason for its bestowal was announced in these words: "An inspiring leader in medical research—to-day the most hopeful of all fields of scientific inquiry.")

You are fortunate in coming to a university to study the

science of medicine in the richest period in its history. It is not many years since "the causes of the simplest diseases were absolute mystery." The whole category of these unknown diseases was classed, within recollection, under the head of "the gale," a class whose name appears in these recent days to have been substituted by that of "the gout." And I suppose that at this time, when the cause of a disease or the disease itself is obscure, it is now relegated to the class of "gout" diseases, exactly as seventy-five years ago it was placed in the list of "gale" diseases. But these terms are now rapidly to disappear, for medicine is becoming a science of precision.

How recent this change has been from empiricism to precision is set forth in a recent address by Dr. Minot. He says: "Listen to the dates. In 1879 Koch introduced the method of solid cultures: in 1882 he published his monograph announcing the discovery of the bacillus of tuberculosis. In 1884 came Löffler's paper on the bacillus of diphtheria. In 1891 appeared Councilman's account of the amœba of dysentery. At the International Medical Congress in 1893 Roux described the use of antitoxin in diphtheria, and about the same time McFadyean secured recognition for the value of mallein in the diagnosis of glanders. In 1896 came Vidal's reaction for identifying the germs of typhoid fever."

What extraordinary and blessed results have followed the patient work in science of these faithful men! It had almost seemed that the knife, through the discoveries of anæsthetics and antisepsis, was directed with greater mercy by the surgeon than internal medicine by the medical practitioner. Doubtless the science of medicine is yet at its beginning, and that there still exist vast regions hitherto unexplored which must yet yield up their unknown lands to the assaults of science for the further amelioration of the life of man. So that while you are here the problem which you have to attack is not only how to place yourself

abreast of the present state of medical knowledge, but to attain such an attitude of mind as will enable you to keep abreast of an ever-advancing science. The medical student and the practitioner of medicine must hereafter be a scientific man, with his microscope ever at his hand, and with that mental state which will not permit him to rest satisfied with himself as he may be in any year; but full of the serious knowledge that his must be a constant progress. Any other course is not only wrong, it might not only be a criminal injury; it might be murder itself.

There is no one of you but will learn that not only have you a science with which you are to acquaint yourselves, but that you have also to learn the great art of practice. I have often wondered to myself upon what, chiefly, this art depended. Does it depend upon knowledge and the power that comes from knowledge? Undoubtedly, to a certain degree; because no one can have that sense of the power which comes from ability to master, without impressing himself upon the mind of his patient. Does it come from sympathy or pity and gentleness? Undoubtedly, for these are valuable elements of the general character,—pity as an emotion, fading into pity as a motive, and gentleness, that great foundation of the building-up of every gentleman,—namely, consideration for the feelings of others. But, if I were to answer the question as to which were the two great qualities which make at all possible the highest practice of the physician's art, I would certainly say: purity of heart and life, and a knowledge of your science. If the ills which have their origin in unclean habits and surroundings develop into pestilences and become known under the general title of "filth diseases," so be assured that there are immutable laws of mental hygiene and of personal purity which cannot be broken without irreparable change. "Before" and "after" are two different persons, and a great gulf fixed between them. Let me speak with you, then, if not upon the

moral ground, upon the strictly hygienic side; for science tells its own story of the destructive changes which come from disobedience to her laws, as well as of the growth of power and happiness which come from observance of them. And certainly, if there be any class of men to whom these things are well known and who have the least excuse of any set of men in the world for avoidance of them, they are the students of medicine in its several sides, and the medical practitioner.

Lead then your vigorous lives,—outdoor, wholesome, full of fresh air; take part in everything which will keep clean and clear the channels of your mind and the activities of your physical condition. Honor yourselves, and so you will be an honor to the University; and in due time, when you shall have left this “City of Truth” to go out into the greater world, you will never regret nor forget the influences of every kind which have here surrounded you.

**ADDRESS BY DEAN WILLIAM DRAPER LEWIS AT THE OPENING OF
THE LAW SCHOOL, OCTOBER 1, 1899.**

Students of the Law Department:—In the absence of our Provost, there devolves upon me the very pleasant duty of welcoming back the old students, and greeting the new students of the Law Department. It is now one hundred and nine years since the first Professor of Law in the University, James Wilson, a Justice of the Supreme Court of the United States, delivered his course of Lectures on Law before the College of Philadelphia as the University of Pennsylvania was then called. It is forty-nine years since Judge Sharswood re-established the school which has since his day, had a continuous history. During this time there have been several changes in location. Until 1874 with the other University departments, we were located at Ninth and Chestnut streets. From 1874 to 1889, we occupied rooms in what is now College

Hall in West Philadelphia; from 1889 to the spring of 1895, we were on the sixth floor of the Girard Building at the corner of Broad and Chestnut streets; since 1895 we have been located in this building. All these changes were but moves from one temporary home to another. This year as you all know, will witness another change of location, but this time the change will not be to any temporary home but to the most complete law school building in the world. Because of this fact, I think you all will agree with me when I say that the year we open to-day bids fair to be of more importance to the Law Department of the University of Pennsylvania than any which has gone before. The opening ceremonies will take place on the twenty-first or twenty-third of February; and it is the hope of the University, the alumni of the department, and the Faculty, to make these ceremonies worthy of the importance of the occasion.

It is proper that I should take this time to call to your attention the changes which death, resignation or new appointment have made in the body of instructors. The sad and tragic death of our lecturer Mr. William H. Carson, is known I presume, by all. Mr. Carson will always be best remembered by those outside of the Law Department, by his work as Assistant District Attorney of Camden. Those of the faculty who came in contact with him in his work here, however, will always remember him as the man of high principle and earnest purpose, who loved his profession and who loved his work as a teacher of law: one who could be counted on to support every movement for the elevation of the bar, or for the furtherance of the cause of good legal education. We all feel the loss of his presence in the school. The course on Carriers conducted by him will be suspended for this year.

Last spring, as all old students know, the Board of Trustees made a welcome addition to the faculty in the person of our District Judge, the Honorable John B.

McPherson. He to-day takes for the first time his place amongst us, having charge for this session of the course on Insurance. There have been no other changes in the personnel of the teaching force except the election of Mr. Arthur Edward Weil and Mr. Thomas Raeburn White, of last year's graduating class, to be Fellows in the Department of Law for one year. Mr. White will, during the session, offer a course on the Statute Law of Pennsylvania as a third-year elective. With the intention of combining the course on Partnership and the course on Corporations in the future, Mr. Pepper will this year give three hours a week on what will be called the Law of Association. This year the course will be mainly devoted to Corporations, and can be elected by any member of the third-year class whether he has already taken the course on Partnership or not. The present second-year class will notice several changes in the course as heretofore given. An increased amount of time is devoted to the course on Bills and Notes, and to the course on Constitutional Law. The course on Quasi-Contracts, having been made a third-year elective, is no longer open to second-year men. A preliminary course on Practice of one hour a week has been added. The minimum number of hours required has been increased from ten to twelve, thus making all the subjects offered compulsory instead of permitting the omission of one subject, as was the case last year. In relation to the course on Practice, I should explain that it is a course on Pennsylvania Practice. Those members of the second-year class who do not expect to practice in the State of Pennsylvania, have the option if they desire of omitting the course, and either electing (subject to the approval of the Advisory Committee) a third-year course; or of producing evidence satisfactory to Professor Patton and the Advisory Committee, that they have done a similar amount of work in the practice of another State.

I am glad to be able to announce that during the summer,

we were able to have bound all the remaining books in the Library needing binding (about one thousand volumes). It may be interesting to note that during the last two years, we have rebound five thousand volumes, and that the Library at the present time hardly contains a single volume in poor condition. The increase in the number of volumes from October 1 of last year, is 2,154. At the present time we have in this building, exclusive of the legal works in the general library of the University, 21,845 volumes—a collection of which the University may be justly proud.

In conclusion, I want to say one or two words to the incoming class. The good which you are going to get out of your three years in this department of the University depends in part upon us and the instruction we give you, but it also depends in no small measure upon yourselves. I take for granted that all of you come here resolute to face hard work and to make a success of your course. In view of our reputation, I can hardly imagine any one seeking this department of the University if he was not fond of work. At the same time there can be different points of view between two or more earnest men, and this difference will in no small degree affect the result of their work. And therefore it is that I wish to impress upon you the importance of constantly keeping prominently before you during your course in this department, at least three facts. The first of these facts is that this is a great University, having a distinctive life of its own, in which life you not only have a right to share, but in which it is part of your education to share. If you keep this fact before you it will follow that you will take a hearty interest in University athletics, in such an organization as the Houston Club; and as members of the Law Department, that you will be actively interested in your class organization and in your law clubs. All these things will not tell you what the law is, but they will tend to mould elements into your character which are essential to professional success, for they will

give you the ability to take your place with other men, and enter into the life of your time in a way to command the attention and the respect of your fellows.

The second fact which I would have you keep always before you is that for the time being this University, its professors, its buildings, its libraries, exist almost exclusively for your benefit. You must remember that you have other rights besides the right to attend lectures and to take examinations. You have a right to go to each one of our teachers and ask him questions on his course; and I am sure you will often find it to your advantage to avail yourself of this privilege. Mr. Patton, Mr. Mikell and Mr. White and myself, have no other offices but our offices in the Law School building, as we devote our whole time to the work. We have regular office hours, and Mr. Mikell has for the past few years made it part of his special duty to assist first-year men. I know I voice the sentiments of each one of us when I say that we always are glad to discuss with a student any matter pertaining to our own courses, the interests of the Law School, or his own work at the University. What is true of the professors, I think you will find is also true of the other servants of the department. Until you get used to working in the library and with legal works, there will be of necessity many questions which you will want to ask concerning the books to be used, notes to be made, etc. In other words, if you fully realize that you have a right to demand good service of all the servants in the Law Department from the oldest member of the faculty down, and act on that realization, I believe that you will find all of us anxious to give you what you ask.

And finally, I would have you bear in mind that this is a professional school, and as such the first step in your life-work as practicing lawyer. You must pass our examinations and you must become a member of some bar, but you are not here primarily to pass examinations or to

become members of the bar. Your business here is to train your mind in legal things, that you may rightfully at the end of three years hold yourself out as capable of advising your fellowmen on matters pertaining to their property, their business honor, and their right conduct generally towards others. No mere superficial knowledge, no mere technical right to place after your name the words "attorney-at-law" should satisfy you. Your object should be to obtain a real grasp of the fundamental principles on which the English-speaking people determine the disputes of men in their private affairs. Come here, in other words, with some thought as to what your responsibilities as a lawyer will be. If you do that, I think you will find that the Law Department of the University of Pennsylvania has something to give you of the traits of character which make the useful man and the efficient lawyer.

THE ORIGIN OF THE UNIVERSITY OF PENNSYLVANIA.

Brief of Argument, June 3, 1899, before Mr. Charles C. Harrison, Provost, Mr. J. Vaughan Merrick, Mr. Samuel Dickson, Right Reverend Ozi W. Whitaker, D. D., and Mr. John C. Sims, Committee upon the University.

Gentlemen of the Committee:—The subject of our inquiry is the origin of the University of Pennsylvania. I presume there can be no doubt anywhere as to the attitude that we ought to maintain in conducting such an inquiry. The University cannot afford to make a claim of priority, or of antiquity, which is not supported by the evidence produced in favor of it: and, on the other hand, it is equally clear that we ought not weakly to abandon a position which can be supported by such evidence. At the outset let us definitely understand just what is the nature of the inquiry. It seems to me that when you are looking for the origin, you are asking

when was the first movement commenced, which, being continued, constitutes an essential part of the organization. If you meet this requirement it is all that can be reasonably asked. And I do not think it is of importance in the inquiry as to whether or not the movement in its origin was regarded as one of importance. Some very great organizations are the result of initial movements which were apparently of very little consequence when they began. If we look for the origin of the oak tree, which is the greatest of all vegetable productions, we find it in one of the smallest of the nuts; and the Amazon River, which is one hundred and fifty miles wide at its mouth, has its source in some spring up in the Andes Mountains. The University has gone through a number of stages. It has been a charitable school, an academy, a college, and a university. Most of the writers who have examined the subject have been content, going further back than the University, and still further back than the college, to rest with the academy, and the reasons for it are natural enough. The gentlemen who were interested in the formation of the academy were people of influence here in Philadelphia at the time. And when they gathered together they made their records, and they wrote their pamphlets and their books, and naturally they did not underrate their own importance in that which they did, and the writers since have been content to look simply at their statements without wider investigation.

But the time has arrived in the history of an institution which has reached great reputation and great influence, that we should be ready to look at all the facts: and if there was a prior movement still connected with the University, of importance in its history, we ought to be willing to go back and to give the credit of it to those who originated that movement, and to claim for ourselves such consequence as is due to greater antiquity.

Each one of the charters of the University shows the

existence of the charity school. The charter under which we are acting now is the Act of 1791, and I read from that charter the direction: "That charity schools shall be supported, one for boys and the other for girls." The University as a university was established in 1779. Section 5 of the Act of 1779 provides for the appointment of a master and assistants "to uphold and preserve the charitable school of the said university." The charter, which was granted on the sixteenth of June, 1755, recites the appointment of trustees and "that they had at their own expense, and by the donations of many well-disposed persons, set up and maintained an academy within our said city as well for instructing youth for reward as *poor children on charity*, and praying us to incorporate them and their successors."

The first charter of the University is the Act of July 13, 1753, and in its recital it sets forth: "Within our said city in maintaining an academy there as well for the instruction of poor children on charity as others whose circumstances have enabled them to pay for their learning." Now this charitable feature of the University is still maintained in the free scholarships which are given to the city, and which were based upon that part of the general scheme. The minutes of the academy have little or nothing to say upon the subject of the charitable school. There is no contemporary printed article, no book, and no original paper known which shows that at the time the academy was designed the men who were instrumental in the foundation of it had any thought of the establishment of a charitable school. That idea was imposed upon them. They made that a part of the scheme of the academy because of some force which came from without. I want to point out to you where it originated. In 1740 there was erected here, under the auspices of George Whitefield, a building which had two objects. One was to provide a place for him, so that when he came here he might be able to preach to the people in it instead of going out upon the

streets and into the fields, as he had been accustomed to do; and the other was to establish a charitable school. That the school was not successful seems to be clear, and when the men who organized the academy started in their work its trustees transferred their building, real estate and funds to those interested in the academy, but they did it exercising some control, upon certain expressed conditions, and in maintenance of their trust. The deed, which was made by them in 1749 to the trustees of the academy, had in it a trust which I am going to read to you. That trust was "likewise to nominate and appoint one or more learned, able, sufficient person, or persons, as master or masters, usher or ushers, mistress or mistresses, to teach and instruct said children gratis in useful literature and the knowledge of the Christian religion."

Now where did that trust come from? I have here a copy from the *Pennsylvania Magazine*, volume 22, page 49, of the advertisement issued by the trustees of the charitable school in July, 1740, and that advertisement sets forth as follows: "With this view it has been thought proper to erect a large building for a charity school for the instruction of poor children gratis, in useful literature and the knowledge of the Christian religion." What I want to point out to you—and it seems to be conclusive upon the question—is that the identical words of this advertisement of July, 1740, are incorporated into the deed which gave you your home in 1749. If you examine it you will see that the trust for the charitable school is set out in precisely the same language in both papers. I think that it is not at all essential that I should go any further, because it is evident that such facts never happened by any chance. There is but one explanation of the trust then incorporated into your organization, and which has been continued down to the present time, and that is that it came from the scheme inaugurated in 1740.

I propose, however, not to rest here, but to call your

attention to a number of authorities. Most of them, perhaps all of them, have never been referred to by anybody heretofore who has written upon the subject. I shall begin with the most recent, and read an extract from *A Journal of Law*, published in Philadelphia in 1831. This legal periodical, as has been pointed out to me by Mr. Dickson, was edited by William M. Meredith, who, in his day, was the leader, or one of the leaders, in our profession: and, while, perhaps, it represents only the traditions of the lawyers at that time, it comes from an intelligent man who was in association with the older members of the bar, and who was in a profession where the necessity of evidence is always recognized. In an article on the University, page 28, he says: "The charity school contains about one hundred and sixty scholars, of both sexes, who are taught gratuitously the elements of a solid English education. The funds for its establishment and support were originally given by several benevolent individuals, and particularly by John Keble. Since its institution, in 1740, it is calculated that several thousand children have enjoyed the benefit of its instructions. It has at present three well-qualified teachers, one in the female, and two in the male department. The grammar school, which, together with the charity school, constituted under the title of the Academy and Charitable School, the foundation on which the college was afterwards erected, has passed through various fortunes. It is associated with the recollections of boyhood to many individuals who now occupy the most distinguished stations in the several professions in our city; and the shrill summons of its piercing bell, and the shriller intonations of several of its able instructors, as they plied the work of mental discipline on their youthful charge, are cherished topics of remembrance."

As you see, he takes precisely the same view as that which I have presented to you.

There was a volume of poems written by John Searson,

formerly of Philadelphia, merchant, printed in Philadelphia in 1797. You would hardly expect to find information of this character in such a publication, but he says, page 87, "In this small collection of poems, I cannot persuade myself to pass over a recitation of the solemn hymn, sung through the States of America, on the death of that animating, that admirable and instructive divine, the Rev. George Whitefield, with an anecdote of him. This gentleman, indeed, like his Master, 'went about doing good.' I lived before and after his decease in the city of Philadelphia, having married there, and remember that it was he who procured the orphan house of Georgia to be built, as also the college and academy of Philadelphia."

The next authority to which I ask your attention, showing the importance of the charitable feature in the life of the University, is a poem delivered at the public commencement in the College of Philadelphia, May 1, 1760, by Francis Hopkinson. He was one of the first graduating class of the college. I believe it was his first appearance before his alma mater upon such an occasion, and the theme he chose was, "Charity." In his quite long poem, he expresses his views upon this subject, and closes :

"Some such there are, without whose friendly care,
Long had his seeds of glory slumbered there;
Without whose bounty all his powers had been
The slaves of ignorance, perhaps of sin.
Of deeds like these, Oh ! who shall sing the praise,
Weak is the muse, and feeble are her lays—
But angels silver-tongued from heaven shall part
To whisper blessings to the bounteous heart;
And those who justly charity regard,
Will find that virtue is her own reward."

And to emphasize his thought, he adds a note saying that he refers to "the trustees of the college, who maintain a charity school for seventy poor children."*

We now come to a contemporary period and writer. I

* Hopkinson's Works, vol. iii, p. 53.

have here an exceedingly scarce little political pamphlet, which was published in Philadelphia in 1764. It is called "A Looking-glass for Presbyterians," and one of the charges which this political writer makes (page 19) against the Presbyterians of that time (1764) is as follows: "The college in this City, planned upon the principles of moderation and liberty, and intended for the use and benefit of every denomination, is now got into the hands of a Presbyterian faction. The professors and tutors being generally chosen of that persuasion, lord it with such a high hand over other professions, that they are not contented with using their power to keep all others out, but are indefatigable in planning to thrust those out who differ from them that are in." What I want you especially to notice is the statement, made at a time when the founders were living, that this college was "intended for the use and benefit of every denomination." Now that principle in the history of the University is of the very greatest importance, for the reason that the University arose over that very question, and when the Act of 1779, which took the college estates away, was passed, it was based upon the ground that they had departed from their fundamental principles, and their charters, and had fallen into the hands of one sect. The act recites, "Whereas the college, academy, and charitable school of the City of Philadelphia, were at first founded on a plan of free and unlimited catholicism; but it appears that the trustees thereof, by a vote in the year 1764, have departed from the plan of the original founders, and narrowed the foundation of said institution." That was the ground upon which their charter was taken away and the University was established. Now where does that feature of your institution come from? There is not the slightest evidence to show anywhere that the founders of the academy had any such thought in their minds, but fortunately we have clear proof of the origin. It is not always that you can get

evidence upon such remote points, but upon this question you have positive testimony. I shall read now from the Autobiography of Benjamin Franklin. In telling us concerning the building and the trustees of the charitable school, he says: "It is to be noted that the contributions to this building being made by people of different sects, care was taken in the nomination of trustees, in whom the building and ground was to be vested, that a predominancy should not be given to any sect, lest in time that predominancy might be a means of appropriating the whole to the use of such sect, contrary to the original intention. It was therefore that one of each sect was appointed, viz., one Church of England man, one Presbyterian, one Baptist, one Moravian, etc., and those in cases of vacancy by death, were to fill it by election from among the contributors."

In addition to this plain statement by Franklin, in going back to the advertisement of July, 1740, you find that they set out: "It has pleased Almighty God to visit with his Holy Spirit, the hearts and minds of many professing Christianity, however divided or distinguished in denomination or interest, so as to make them lay aside bigotry and party zeal." So that you have this feature of the original plan traced, directly not to the academy, but to the charitable school beyond it, and you further find that the establishment of a university was due to the belief that that feature in the original design had been broken by the then trustees of the college and academy.

I shall now read to you an extract from the address to the trustees of the academy, at its opening (1751), which was made by Richard Peters, who had been selected for that purpose, and I want you to look at it bearing in mind that Peters was one of the men connected with the organization of the academy, so that in order to understand it you have to read between the lines as it were. "Thus successful, it became a matter of debate where to place the

academy, and many arguments were offered for some village in the country as best favoring the morals of the youth, too apt to be corrupted by the bad examples abounding in populous cities. But when it came to be considered that it would take a large sum to erect proper buildings at a distance from the city ; that the circumstances of many of the citizens would not admit of a distant place on account of the expense ; that the trustees were men of business who could not be absent from their habitations without much inconvenience ; and that the success of the whole, under God, would, in a great measure, depend, whether in town or country, on the personal care and attendance of those entrusted with the management, it was thought proper to fix it somewhere within the city ; and the more so, when the minds of the trustees of the building, where we are now assembled, came to be imparted. These thoughtful persons had been for some years sensible that this building was not put to its original use, nor was it in their power to set forward a charity school, which was also a part of the first design, and that it was more in the power of the trustees of the academy than in others to do it ; they therefore made an offer to transfer their right in it to the use of the academy ; provided the debts which remained unpaid, might be discharged and the arrears of rent paid off. This was thankfully accepted, and a conveyance was executed, and on the settlement of the moneys due on account of the building, some of its trustees even generously forgave a considerable part of their just demands."

It appears, therefore, from the statements of this address, that the determination to establish the academy in the city, in preference to the country, was reached upon consideration of the views of the trustees of the charitable school ; that the specific location of the academy was fixed by the convenient and suitable structure which they had previously erected ; that they conveyed, without charge or return of outlays, the building in which the work of the

academy was begun, and for many years continued ; and further, that they gave a portion of the moneys needed by the academy as a contribution to its purposes.

Peters says, moreover : "Whilst I am acknowledging their merit, let me not forget to do justice to their absent co-trustee for his ready and hearty concurrence, signified in his letter to the president on that subject." That co-trustee was George Whitefield, and in the letter he wrote from England to the president, dated February 26, 1750, he said : "I think also that in such an institution there should also be a well-improved Christian orator, who should not be content with giving a public lecture upon oratory in general, but who should visit and take part with every class and teach them early how to speak and read and pronounce well. An hour or two in a day ought to be set apart for this. . . I should also like the youths to board in the academy, and by this means to be always under the master's eye. . . If these ends are answered, a free school erected, the debts paid, and a place preserved for public preaching, I do not see what reason there is for any one to complain." You will observe that he was perhaps the first to suggest the dormitories which have only recently been erected, but what I want you to especially notice is the tone of the letter. It is not that of a man who is making a surrender, but that of one who has the situation well within his own control, and who is expressing the views which, in his judgment, ought to be impressed upon the academy they were then starting. Whitefield was an orator—one of the greatest the world has ever seen,—and naturally his attention was directed toward that subject, and he tells us in this letter how he thinks oratory should be taught. In his view it is essential, and ought to be taught not only by the professor giving general public lectures, but by his going to each pupil and seeing that he is taught to pronounce properly and read well. In connection with that subject, I want to show you, from the

description which Dr. William Smith wrote of the academy, how that direction was carried into effect. In the papers of Dr. Smith, printed in London in 1762, upon pages 100 and 112, he says: "Oratory and the correct speaking and writing of English are branches of education too much neglected, as is often visible in the public performances of some very learned men. But in the circumstances of this province, such a neglect would have been still more inexcusable than in any other part of the British Dominions; for, being made up of so great a mixture of people, from almost all corners of the world, necessarily speaking a variety of languages and dialects, the true pronunciation and unity of our own language might soon be lost, without such a previous care to preserve them in the rising generation." And this is the way he says it was done: "For attaining this, a small rostrum is erected in one end of the school, and the youth are frequently exercised in reading aloud from it, or in the delivery of short orations, while the professor of English and oratory stands by to correct whatever may be amiss either in speech or in gesture." So that when the academy was established, the teaching of oratory was followed upon precisely the plan indicated by Whitefield in his letter.

Mr. Harrison informs me that this method of teaching oratory was continued at the University until a very recent period.

I have now gone substantially over the evidence which I intended to present to you. No doubt further inquiry would bring out still other points, but there already has been established, I hope to your satisfaction, enough to prove that much of the organization of the University was derived from the charitable school of 1740. To resume, it has been shown that the determination to put the academy in Philadelphia; the location of the academy on Fourth street; the building itself in which all the exercises were conducted for the greater part of a century; the

charitable idea which has run through all of your charters, and still exists; the very considerable proportion of the moneys used for the establishment of the academy; its feature of catholicity, about which there can be not the slightest question, and which has been of the greatest consequence in the history of the University; and the establishment of the school of oratory and its methods can be traced directly to the charitable school.

Now it does seem to me that with all of these facts before us, if we should attempt to disregard them, or to set them aside, we should not only commit a grave injustice to those who did so much to benefit the cause, but display singular inaptitude and want of good judgment.

Perhaps before concluding, I ought to say that the view which I have been presenting to you with respect to the origin of the University has been accepted by most of those who have recently written about our institution. Dr. McMaster and the late Thompson Westcott, who was perhaps our leading local historian, both entertained that view, although neither of them had the opportunity to consider the papers I have presented to you here. There is, however, one exception, and that is an exception of importance. There was no man who was better informed with respect to our history, and more earnest in its investigation, than the late Dr. Frederick D. Stone. He wrote a chapter for the recent edition of the *History of the University* by Dr. Wood, in which he takes a different view. In his preface Dr. Stone says that it is a controversial chapter. Now I believe I have never known in my experience of any claim which has ever been made in behalf of the importance or priority of Philadelphia, that there did not arise some Philadelphian who was ready to enter into a controversy to show that the claim was not well founded. The main evidence upon which Dr. Stone rested he set forth in this paragraph: "No charity school had been opened up to August, 1747, as in that month a petition was presented to the assembly

by some of the subscribers to the new building, stating that the establishment of a charity school was a part of the original scheme ; that none had been established ; and they therefore prayed that the trustees be obliged to pay the petitioners their subscriptions, or that an act be passed to sell the building and devote the proceeds to that purpose."

To begin with, there is a miscitation of the evidence. In that petition which was presented to the Assembly it was not said that no charity school "had been established." The entire extract from the Votes of Assembly, Vol. IV, page 59, is as follows: "6 mo., 8th, 1747. A petition from sundry persons, inhabitants of the City of Philadelphia, setting forth that they contributed largely, according to their respective circumstances, towards the building of a house in the said City which was intended to be a charity school for the instruction of poor children gratis in the knowledge of the Christian religion and in useful literature, and also for a place of public worship: But the trustees not having executed their trust, the principal end for which the petitioners engaged in the subscription and paid their money is not in the least degree answered; and therefore praying that the said trustees may be compelled to refund and pay the money advanced by the petitioners as well as their other just demands; or otherwise that leave may be given to bring in a bill for the sale of the said building for that purpose was presented to the house and read and ordered to lie on the table."

As you see, that was a petition presented to the Legislature upon the part of some people who had contributed moneys, and who wanted the building to be sold and the moneys to be paid back to them. They were therefore in the position of plaintiffs in a cause. Dr. Stone, unfortunately, has taken that statement of the plaintiffs as though it were necessarily correct, and then he has put an interpretation upon their language, and then he has given you not what they say, but what was his interpretation, as a

fact. But on the same page of the minutes of the Assembly is this entry : " A petition from Charles Brockden and James Read, two of the trustees of the house commonly called the new building, was presented to the house and read, setting forth their purpose to lay before the house a full and particular answer to the petition and complaint of John Coats and Edmund Woolley, but several of their number whose concurrence they would willingly have therein being at present out of the province, or at a considerable distance, and so have had no opportunity to see the copy of the said petition, they request the house would indulge with further time for the purpose. Ordered to lie on the table."

So it appears that the defendants in this cause were ready to file an answer, and that the facts, whatever they were, were in dispute, and what more appears is that if there ever was any decision it was in favor of the defendants, because the men who presented that original petition wanted to sell the buildings, and we know that that power never was granted. In addition to that fact, if you look at the words of the petition, you will see that what they say is not that there was no charitable school established, but that the principal end was not accomplished, and to find out their meaning it is necessary to ascertain what was the principal end. There were two ends to be accomplished. One was to erect a charitable school and the other was to provide for the preaching of Whitefield, and Whitefield was not in America, so that it is also altogether probable that the principal end was the preaching of Whitefield rather than the charitable school. In any event the meaning of the paper remains in doubt and its allegations, whatever they were, were to be met by an answer, which fact Dr. Stone entirely ignored.

In conclusion, even if you should determine that the charitable school was a very unimportant affair, and one not at all successful, which I believe to be the truth, you

will be entirely justified in your claim by the precedents furnished by the action of other and earlier colleges.

Harvard University celebrated on the eighth of September, 1836, her two hundredth anniversary, so that she claimed as the date of her beginning September 8, 1636. But Harvard, who gave by will the money for her foundation, did not die until September 26, 1638, two years later. In seeking to establish the earliest possible time, the university relies upon this action of the Court: "September 8, 1636: The court agreed to give four hundred pounds towards a school or college, whereof two hundred pounds shall be paid the next year and two hundred pounds when the work is finished, and the next court to appoint where and what building." So you see all that they have of a tangible character to support the claim is a promise upon the part of somebody to pay two hundred pounds a year afterwards, and yet it has never been the subject of criticism.

Yale claims as the date of her origin the year 1701. Such school as was then established was at Saybrook, and it was not until 1716 that a building was erected at New Haven, and the year after their asserted origin there was just one stray young man who came to be instructed.

When, therefore, you are able to show facts of much more moment than those upon which these precedents are based, that in 1740 you had a commodious building erected, a large sum of money already contributed, and the organization of a charitable school under a board of trustees which has continued without lapse down to the present, it seems to me that the most pronounced hypercriticism cannot object to your contention that that date is properly the date of your origin.

The Board of Trustees at its meeting, June 6, 1899, upon motion of the Committee on University, unanimously

“Resolved: That the thanks of the Board be returned to our colleague, the Hon. Samuel W. Pennypacker, for the statement prepared by him containing the account of the facts connected with the foundation of the University of Pennsylvania, and that it be spread upon the minutes and be published in the BULLETIN.

Resolved: That the date of foundation heretofore affirmed, A. D. 1740, as that of this University is shown to be warranted by this statement, which traces the direct connection between the Charitable School founded in that year and the Academy and Charitable School organized in 1749 and chartered in 1753, which continued to occupy under the terms of the original trust the building erected by the Trustees of the Charitable School.”

PROCEEDINGS OF THE CORPORATION.

At a stated meeting, held June 6, the following business was transacted :

Resignations were accepted from Julian Millard, Assistant Professor of Architecture, and Arthur C. Howland, Senior Fellow in European History. The following elections were held : Hon. John B. McPherson, Professor of Law ; Edwin S. Crawley, Scott Professor of Mathematics ; James Tyson, Professor of Medicine ; John H. Musser, Professor of Clinical Medicine ; Alfred Stengel, Professor of Clinical Medicine ; Gwilym G. Davis, Assistant Professor of Applied Anatomy. The following reappointments were approved : Lecturer Materia Medica, Dr. A. W. Miller ; Demonstrator Pharmacodynamics, Dr. H. C. Wood, Jr. ; Instructors in Clinical Medicine, Drs. M. H. Fussell, Judson Daland, Alfred Stengel, F. A. Packard, W. H. Price, S. M. Hamill ; Instructor in Obstetrics, Dr. R. C. Norris ; Assistant Demonstrators in Obstetrics, Drs. W. R. Nicholson, W. A. N. Dorland, J. H. Girvin, W. F. Sprengel ; Instructors in

Physical Diagnosis, Drs. A. A. Stevens, B. F. Stahl, A. O. J. Kelly, H. B. Allyn and F. S. Pearce; Demonstrator of Physiology, Dr. J. P. Arnold; Assistant Demonstrators of Physiology, Drs. J. H. McKee, A. F. Witner, W. S. Wadsworth, P. W. Darrah, N. S. Yawger; Instructor in Clinical Surgery, Dr. A. C. Wood; Assistant Instructors in Clinical Surgery, Drs. G. D. Morton, C. L. Leonard, C. H. Frazier; Demonstrator of Chemistry, Dr. D. W. Fetterolf; Assistant Demonstrator of Chemistry, Dr. L. A. Ryan. The purchase of the Foulke-Long Institute property, northeast corner of Thirty-fourth and Locust streets, was approved. The Boardman Lectureship in Christian Ethics was established through the generosity of the Rev. George Dana Boardman. A new University seal was adopted, after a competitive design submitted by Mr. Alfred Morton Githens (B. S. in Architecture, Pennsylvania, 1896), and the secretary was instructed, upon the completion of the cutting, to break the existing seal. The question concerning the year of origin of the University (with regard to which some doubt had arisen) was settled by an opinion from the Hon. S. W. Pennypacker, President Judge of one of the Common Pleas Courts of Philadelphia, the date 1740 being confirmed and established as the year of foundation. The Harrison Scholarships (in the Graduate School) heretofore open only to graduates in the courses in Arts and Science, were declared open to all baccalaureate graduates of the University; whilst the Harrison Fellowships (in the same school), heretofore open only to persons holding a baccalaureate degree in Arts or Science, were declared open to the holder of any baccalaureate degree.

The thanks of the corporation were voted as follows: To Thomas H. Montgomery, Esq., for "Wilsoniana"; to the Class of 1879, College, for the E. Otis Kendall Scholarship; to Rev. Dr. George Dana Boardman, for the establishment of the Boardman Lectureship in Christian Ethics; to Hon. S. W. Pennypacker, for his opinion as to

date of origin; and to donors of funds and books. The customary mandamus was ordered for the conferring of degrees on June 15, and adjournment made to that date, to attend the public commencement.

At a stated meeting held on October 3, 1899, the following business was transacted:

The resignations of the Hon. Charlemagne Tower, as a trustee of the University, and of George S. Graham, Esq., as Professor of Criminal Law, were accepted with resolutions of regret. Appointments were confirmed as follows: G. M. Richter, Instructor in French and German; Rev. William Fairley, Senior Fellow in European History; Gilbert H. Boggs, Harrison Fellow in Chemistry; Henry C. Coffeen, University Scholar in Mathematics and Astronomy; Sarah Pleis Miller, University Scholar in Biology; Gershon B. Levi, University Scholarship in Semitic Languages; Helen G. Pearson, University Scholar in European History. Thanks were voted to the Antiquarian and Numismatic Society for the gift of a bronze medal commemorative of the late Prof. Daniel G. Brinton. Contracts were approved for the erection of the War Memorial tower and gateway, to form part of the dormitory system, and also for an additional section to the latter. Announcement was made of a gift of \$50,000 toward the foregoing object.

HONORS TO DR. HORACE HOWARD FURNESS.

[From the *Philadelphia Public Ledger*, August 24, 1899.]

"On June 13, the University of Cambridge, England, conferred on Dr. Horace Howard Furness, of Philadelphia, the degree of Doctor of Laws, in recognition of his achievements as a Shakesperean editor and scholar. To-day the *Ledger*, with many apologies to its readers for the delay, is the first Philadelphia newspaper to fitly note and chronicle this event, so honorable to our American world of letters and to the great English university which has thus singled out our distinguished townsman to pay him this tribute. It is eminently fitting that this highest of all English

literary honors should come from Cambridge, for that is, indeed, the mother of American universities.

"From its Puritan colleges came the early settlers of New England and the first impulse for Harvard and its long line of younger sisters, the American universities. Dr. Furness, like his noble father, the late Rev. Dr. William H. Furness, was a graduate of Harvard, and there both father and son drew much of that inspiration which made them such masters of their mother tongue. The elder Furness preached in Philadelphia for successive generations, spreading not only his own beautiful religious spirit, but with it a love of pure literature that has fed many thirsting for knowledge, and all his gifts he transmitted to his son, Horace Howard Furness, who has made the world wiser and better by his lifetime of labor spent in his 'Variorum Shakespeare,' volume after volume attesting his wise study, his manifold knowledge, his genius for interpretation and that characteristic and hereditary virtue, his modesty as to his own gifts and the use of them. His native city has sedulously cultivated that modesty by taking little account of his achievements, and his remarkable work is really known and appreciated by a comparatively small body of students in Philadelphia. The University of Harvard and that of Pennsylvania, to both of which Dr. Furness has given much helpful labor, did, indeed, acknowledge it by honorary degrees; but the University of Cambridge has worthily enrolled him among the great men whose names are found on its long list of those to whom it has given its best and highest honors. Dr. Furness is the only Philadelphian to whom this signal distinction has come, and the only Americans to share it with him are Dr. Oliver Wendell Holmes and Charles Eliot Norton.

"To be a third on such a brief list is, indeed, a signal honor; but in Dr. Furness' case it is the more marked because Cambridge has produced the men most noted as authorities on Shakespearean literature, and it is by their hearty approval that Dr. Furness receives the right to take a high place among those who have thus enriched our English literature by a profound and exhaustive study of the works of its greatest light, and becomes a Doctor in Letters of the University of Cambridge.

"Among the scholarly recognitions of Dr. Furness' literary knowledge is his selection to edit the revised Bible now being issued by Dr. Haupt, of Johns Hopkins University, and his colleagues, the greatest authorities on the Bible of our day, English, American and foreign. Through the alembic of Dr. Furness' critical judgment their English is to pass, thus securing the highest standard of excellence, and in this, too, the English Cambridge finds a ground for its tribute to the judgment of Dr. Furness.

"It is only too true of Philadelphia that it is too slow to honor its own sons. Leidy in science, Lea in history and Furness in literature have long since received the highest praise from the best foreign authorities, and taken the front rank in their own line of study and writing, yet here at home their honors are rare. We may all, therefore, thank Cambridge for the honor it has paid to a Philadelphian so eminently worthy of our respect, our admiration and our affection."

The following is the speech delivered by the Public Orator, Dr. Sandys, Fellow and Tutor of St. John's, at the Congregation held at noon on June 13, in presenting for the degree of Doctor in Letters *honoris causâ* Horace Howard Furness, LL. D., (Harvard and Pennsylvania) editor of the "Variorum Shakespeare":

"Adest hodie e fratribus nostris transmarinis rerum divinarum interpretis humanissimi, Afrorum libertatis per vitam longam vindicis acerrimi filius; adest poetae nostri summi interpretes indefessus, qui Shakespearii fabulis undecim per libros fere totidem accuratissime recensendis et non sine interpretum plurimorum auxilio eruditissime explicandis, annorum triginta labores dedicavit. Laetamur reipublicae maximae transmarinae civem ad interpretandam poetam, qui aequoris Atlantici in litore utroque linguae nostrae communis inter decora conspicua numeratur, tantam eruditionem, tantam ingenium, per tot annos contulisse. Laetamur poetae tanti interpretem in hac praesertim Musarum sede laureâ nostrâ hodie coronari, ex quâ poetae eiusdem textus Cantabrigiensis ab alumniis nostris duobus, ab oratore quondam nostro et a Collegii eiusdem socio quem adhuc superesse gaudemus, primum voluminum complurium per seriem editus, deinde unico in libello inclusus, per orbem terrarum totum exivit. Poetae nostri in fabulâ quâdam, ab hoc viro haud ita pridem editâ, ubi aestatis mediae somnia nocturna lepidissime narrantur, e faunis silvestribus unus intra horae unius spatium orbem terrarum totum vinculo uno sese eiuncturum esse andacter pollicetur; quod si, aestatis in hac horâ meridianâ, etiam nobis licet aliquantulum gloriari, nos hodie in multo minore temporis intervallo, in hoc ipso temporis momento quo reipublicae maximae transmarinae citem egregium, poetae nostri summi interpretem eximium laudamus, orbis terrarum partem utramque vinculo novo inter sese coniungimus.

"Duco ad vos virum et nobis et Britannorum poetae summo coniunctissimum, HORATIUM HOWARD FURNESS."

LAW ANNOUNCEMENTS FOR 1899-1900.

In the Law Department of the University the following changes have been made in the course of instruction: In the first year one of Professor George M. Dallas' hours in Torts will be given by Mr. Francis H. Bohlen. The course on Crimes, conducted last year by Mr. Joseph Gilfillan, will be conducted this year by Assistant Professor William E. Mikell. The course on Property, which was conducted by Professor C. C. Townsend during the first term and by Mr. T. R. White during the second term of last year, will this year be given by Professor R. D. Brown. The course on Domestic Relations will not be given; most of the ground formerly covered under this title will be included in the new course on Blackstone by Professor Mikell. This course on Blackstone will cover the entire four volumes and will be given two hours a week throughout the year.

Blackstone is now an entrance requirement, and all students not taking the entrance examinations in this subject are obliged to attend Mr. Mikell's course.

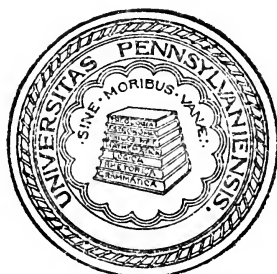
In the second year, the course on Constitutional Law, by Professor George S. Patterson, will be three hours a week instead of two, as heretofore. The course given in Partnership last year by Professor G. W. Pepper has been consolidated with the course on Corporations of the third year, and therefore will not be open to second-year men. The course on Property will be given by Mr. Owen J. Roberts. The course on Bills and Notes has been increased to two hours a week throughout the year instead of one and one-half hours, as last year. The courses on Quasi-Contracts, Agency and Carriers have been dropped. The present second-year men will have an opportunity of electing these three subjects in their third-year course, the present third-year men having had an opportunity of electing them last year. Professor John W. Patton will give one hour to the second-year men on Practice, this being in the nature of an experiment. Last year there were open to the second-year men fifteen hours per week, of these they were obliged to elect ten. This year the Junior Class is compelled to take twelve hours, thus making the entire course of the second year compulsory.

In the Senior year, the former third-year course on Corporations and second year Partnership have been consolidated by Professor Pepper under the title of "Law of Association," three hours a week throughout the year. A course on Insurance, given last year by Professor Pepper, will be offered by the newly-elected Professor John B. McPherson. Dean W. D. Lewis offers a new course in Equity covering the jurisdiction of Equity over Torts, one hour per week throughout the year. The course on Insolvency and Bankruptcy, offered by Professor Brown last year, will be given by Mr. Roberts this year. The course on Property will be given by Professor Brown instead of Mr. Gilfillan. The course on Suretyship and Municipal Corporations has been dropped from the third-year curriculum. The course on Constitution and Statutes of Pennsylvania, given by Mr. A. G. Dickson last year, has been divided, the Constitution of Pennsylvania being offered by Mr. Dickson one hour throughout the year, and a new course on Pennsylvania Statute Law by Mr. Thomas R. White, the new Fellow, one hour a week throughout the year. Mr. Arthur E. Weil, who also received a fellowship last year, will have the general superintendency of the *American Law Register*, the official publication of the Department of Law.

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PROCEEDINGS OF THE CORPORATION.

At a stated meeting, held on Tuesday, November 7, the following business was transacted:

A committee consisting of the Provost, and Messrs. Rosengarten, R. C. H. Brock, Houston and Jastrow, was appointed to co-operate with similar committees of other bodies in connection with a memorial meeting to the late Daniel G. Brinton. Elections were held as follows: John Goodrich Clark, Professor of Gynecology; William E. Mikell, Assistant Professor of Law; Stewart Culin, Lecturer in Ethnology and American Archaeology. The appointment of Arthur P. Bauder as Instructor in Physics was confirmed.

Changes in titles were made as follows: that of the Chair of Assyrian and Comparative Semitic Philology to Semitic Philology and Archaeology; Dr. Bates becomes Instructor in Greek and in Classical Archaeology, and Professor Dallas becomes Professor of Law. Announcement was made that the Department of Archaeology and the Archaeological Association had merged under the former title. The dedication of the new Law School Building was fixed for the afternoon and evening of February 21, 1900. Order was also made for the laying of the corner stone of the War Memorial Tower, in connection with the dormitory system, for December 2.

BIOLOGY AND MEDICINE: BIOLOGY AS A PROFESSION.

Edwin Grant Conklin.

[Address at the Opening of the Biological Department, September 29, 1899.]

Three years ago I had the pleasure of speaking to you on an occasion similar to this upon the subject of Biology and Education; to-day I wish to direct your thoughts to

two cognate themes, viz.: Biology and Medicine, and Biology as a Profession.

I. Historically there has always been a very close relation between medicine and biology. The mere mention of the names of Galen, Versalius, Fallopius, Eustachius, Malpighi, Harvey, Hunter, Linnaeus, Erasmus, Darwin, Johannes Müller, Virchow, Kölliker, His, and a host of others, is the most eloquent testimony to the close relationship which has always existed between these two disciplines. And yet it is, at first thought, a surprising fact that up to the beginning of this century there was no necessary or fundamental relationship between the two. If the physician studied natural history it was by way of recreation—an avocation, merely. Less than one hundred years ago medicine was an art, and not a science; and the art of healing was no more dependent upon biology than sculpture is dependent upon geology. To-day medicine is both an art and a science; and between the science of medicine and the science of biology the closest and most fundamental relations exist. A man may be a "pill dispenser" without any aid from biology, but scientific medicine is impossible without a biological foundation.

Where can such a foundation best be obtained—in the schools of medicine or in the schools of biology? In the latter; and for very many reasons. Such work is no part of medicine, but a foundation for medicine. It must present a broad view of the structures and functions of animals and plants; and to this end it requires specially trained teachers, peculiar facilities, and time for comparative work. Medical schools, in general, lack the facilities for such work; and even if they possessed them, they would be unable to find the time within the limits of a four-year course for comparative work in botany or zoölogy. The continually increasing specialization of the medical sciences, and the great number of subjects which must be given a place in every first-class medical school, must completely crowd

biology out of the medical course. Biological training must be regarded, not as a part of medicine, but as preliminary to medicine. Already a preliminary knowledge of biology is required for admission to the Johns Hopkins Medical School, and the time is certainly not far distant when such a requirement will everywhere be made.

"Medicine," said Professor Minot in his address at the last Commencement of the Yale Medical School, "is one department of applied biology, just as dyeing is one department of applied chemistry, or electric lighting a department of applied physics. Now if a man wishes to become an expert dyer or electrician he studies chemistry as a whole, and physics as a whole; but the would-be-physician begins at once with human anatomy and human physiology, and probably to the end of his days never discovers that he has no conception whatever of biological science. . . . The fundamental principles of biology ought to be taught to every student of medicine before he is allowed to study medical anatomy or physiology. This great reform will surely come about, and has, in fact, been already effected by one important university, which has made biology a requirement for admission to its medical school."

I congratulate you who are going into medicine that you have begun in the right way; and I hope and believe that through the training which you will here receive you will be able to do your medical work more thoroughly and intelligently, and afterward take a higher position in your profession than will be possible to those who have had no preliminary training in biology.

II. Turning now to the subject of biology as a profession, I wish to discuss two questions: First, its rank among the professions; and second, the opportunities which it affords for a livelihood. First, as to its rank. It must be confessed that the popular idea of the biologist is not a flattering one. Chemists, electricians, inventors are held in high esteem by the public; they seem to be doing some-

thing for the good of mankind. These professions have a direct money making value, and they are commonly esteemed in direct proportion to their capacity for making money. But the naturalist finds few sympathizers among busy men of affairs. The things he prizes are "trash" to most people, and he is often regarded as a kind of madman—at best a harmless crank. What biologist has not again and again been impressed with the fact that it is impossible for him to make people understand why he is willing to spend years of labor in studying animals and plants which are not good for food, and have no commercial value? To much of the world life is no more than meat, and the man who devotes himself to other aims must remain an enigma. But who that has ever known the joys of investigation, of discovering the order of nature, of "thinking the thoughts of God after Him" would for a moment compare the dignity and value of such work with that of any business or profession whose chief aim is pecuniary gain! The biologist's work is no less useful to the world, and his rank is not less than is that of the chemist, the physicist, the astronomer,—the scientist in general. The rank of biology as a profession has been established past our making or marring by Aristotle, Linnè, Buffon, Lamarck, Cuvier, Darwin, Müller, Sachs, Haeckel, Huxley, Wallace, Agassiz, Leidy, Ryder, Cope. Under the shadow of these honored names, on the very spot where the last three lived and worked, who will question the rank of biology among the professions?

Some of you are looking forward to biology as the means to a livelihood: I am sorry that I cannot speak to you with much assurance and enthusiasm. It is a rare thing when research in biology yields a living. Formerly it was coupled with medicine, and to a certain extent this is still true; but more recently it is generally united with teaching. The biologist lives *in* his investigations and *by* his teaching. There are from year to year a certain number

of good positions in high schools, private schools, normal schools, colleges and universities—positions which give some opportunity for research and pay as much, perhaps, as the earnings of the average lawyer or physician. Such positions are never very numerous nor lucrative; but to the man or woman who is capable and is ready to make sacrifices for his love of science, they are sufficient. But while teaching or economic work in biology may yield a living, there is no money in it. If you are looking for a profession in which to make money—go elsewhere. The qualities required of the successful teacher or investigator in biology would, if turned to other pursuits, yield vastly larger financial returns. These qualities involve not merely a knowledge of your subject, but ability to teach, general culture, and above all real manhood or womanhood. If you are going to be a teacher of biology, and mean to live by your profession, do not rely merely on your knowledge of that science. Your biological “gun” may be greater than ever was before, but in this profession, as in that of arms, it is the “man behind the gun” that counts.

UNIVERSITY EXCAVATIONS AT NIPPUR.

Albert T. Clay.

On the occasion of Professor H. V. Hilprecht's leaving for Babylonia to take charge in person of the excavations now being conducted for the University, it is fitting to review briefly the wonderful results achieved, and at the same time to set forth the primary object the committee and scientific director have in view for the present campaign.

For the past eleven years, including interruptions, the “death-like stillness” which brooded over the mounds of ancient Nippur (the probable site of Calneh, *Genesis*, 10: 10), with its treasures of long-forgotten millenniums, has been dispelled, and the place is now the scene of much activity. Having the earliest terraced temple that is known in a land of primi'tive

civilization, the very cradle of the universe, Nippur has become a centre of absorbing interest to many.

On the basis of the important discoveries made here, ancient history has undergone radical changes and is reconstructed at many points from the earliest to the latest periods. The inscribed objects cover a period of about 6,000 years, and enable the historian to reach back into the dawn of civilization and cover a period to about 700 A. D. Through them the historical features of the hitherto-considered legendary kingdoms of Sargon I and Naram-Sin, about 3800 B. C., have been established; and, what is more important, a still earlier non-semitic civilization called Sumerian has been traced, embracing many centuries.

Prior to these excavations, nothing was known in Babylonian history of the period which precedes Sargon I. The excavators have gone thirty feet below the Sargonic level, down to the virgin soil, which means about the same distance below the meadows.

The accumulation of débris from ruined buildings, etc., through which they went, indicated a time of advanced civilization. The period embraced by this lowest strata can only be conjectured at the present time. Considering the accumulations and antiquities above and below Sargon's time, Professor Hilprecht says: "I do not hesitate, therefore, to date the founding of the temple of Bel and the first settlements in Nippur somewhere between 6000 and 7000 B. C.; possibly even earlier."

Unfortunately, nearly all of the earliest works of art in stone are found in a fragmentary condition. This is due largely, it is thought, to the invasion of the Elamites about 2250 B. C., who broke up and scattered all that they did not desire to carry with them. Strange it is to say that from these fragments possibly the greatest results thus far have been achieved. From these Professor Hilprecht has restored inscriptions containing the names of about fifteen kings who lived prior to the time of Sargon. Thus far the masterpiece of work of this eminent Semist is the restoration of a most important inscription of 132 lines from 88 fragments of 64 different vases. These were selected from about 600 fragments, all of the same character.

Among the many interesting antiquities found in the lowest strata was a sacrificial altar of sun-dried bricks, about thirteen feet long and eight feet wide. It was covered with a layer of ashes several inches thick. Near this altar were found several large, beautifully-designed terra-cotta vases, which were quite likely used in connection with the temple service. The most ancient perfectly constructed keystone arch, hitherto considered Roman, was found in the lowest strata. Bronze and iron objects, beautifully colored pottery, which if found in an upper strata would undoubtedly be pronounced Grecian, or showing at least "the influence of Greek art", were likewise discovered. All indicate that the golden age of Babylonian civilization must be sought about this time. Or, in the words of Professor Hilprecht, "that behind Sargon I and Naram-Sin there lies a long and uninterrupted chain of development covering thousands of years; and that these two powerful rulers of the fourth millenniums before Christ, far from leading us back to the dawn of civilization, are at the best but two prominent figures from a middle chapter of the history of Babylonia."

The collections of bricks used in the construction and restoration of the temple of Bel, are also among the valuable finds. Especially important are those containing inscriptions of the different rulers who engaged in this work. Much data has thus been gained for the reconstruction of Babylonian history. The inscribed bricks which inform us who were actively engaged in the enlargement and restoration of the temple, cover a period from Sargon I to Ashurbanapal, about 650 B. C. At the same time the uninscribed bricks are also interesting and valuable, especially those of different shapes and sizes, in that they show to what extent the Babylonians made use of clay in the construction of pillars, pilasters, arches, drains, etc.

By far the great bulk of treasures found at Nippur are in the shape of cuneiform tablets, numbering about 40,000. They disclose almost every kind of literature—syllabaries or dictionaries, historical fragments, chronological lists, astronomical and building inscriptions, religious texts, votive and contract tablets, lists of taxes, plans of estates, multiplication tables, etc. The publication of selected texts will finally embrace about twelve volumes of one, two or three parts each, edited by the scientific director.

The expedition has secured for the University Museum specimens of the different kinds of sarcophagi used by the Babylonians. Most of these are slipper-shaped, made of thick, half-burnt clay, and were covered originally with a blue glaze, which in time turned green. Other specimens, bath-tub shaped, in addition to the different kinds of burial urns used, have also been preserved. Pottery of all description, sizes and shapes from tombs and houses; jewelry in gold, silver, ivory, shell and stone; tools, weapons, utensils, and coins in bronze and iron, are well represented in the collections. In addition to the records recovered from Nippur, large collections of tablets from Yokha, Kappadokia, and other places, have been secured. Especially interesting to biblical students is the large door socket from Ur, the home of Abraham, which was inscribed about three hundred years before his time, and placed at the entrance of its temple.

The primary object which the expedition has in view at the present time is the search for the great gates so frequently mentioned in the inscriptions, and to trace out the walls of the city. At the same time a large force of Arab workmen will continue to excavate the lower strata of the temple area, of which but a small portion has thus far been removed. But more important than all else, Professor Hilprecht, assisted by several architects, will endeavor to depict the ancient sanctuary of Bel on the basis of the ruins laid bare, with the view of giving an intelligent idea as to its construction and how it appeared in ancient times.

Scholars and laymen cannot but feel under deep obligations to the University for this great undertaking, for the systematic manner in which the excavations are conducted, and for the scientific treatment of the documents recovered. At the same time, the University is under obligations to the members of the Babylonian Exploration fund, to whose unselfish generosity and interest in the expedition the great results achieved are chiefly due. The work of excavating Nippur will not be completed with this campaign. In fact, but a very small portion of that great city with its temples has thus far been excavated, but the committee expects to continue the work begun for years to come.

**REVIEW OF VOLUME I—PART II—OF THE UNIVERSITY SERIES
IN ASTRONOMY.**

Charles L. Doolittle.

When the erection of an Astronomical Observatory was determined upon by the Trustees of the University of Pennsylvania five years ago, it was understood that the duties of the director and his assistants should embrace two lines of activity. First, that of instruction including advanced courses in the Department of Philosophy for such as might wish to qualify themselves for professional work; and second, original research. It was hoped that the latter might in time be represented by a series of publications embodying in permanent form for the benefit of those interested the results which might from time to time be obtained. A considerable number of papers have already appeared in various scientific journals, some of them giving results of laborious investigations undertaken at this Observatory. The work which forms the subject of this review, however, is the first of the proposed series to make its appearance.

Vol. I—Part I—will contain a description of the buildings and instruments, with a determination of the longitude. Part II gives the details and results of a carefully executed series of latitude observations, extending in time from October 1, 1896, to August 16, 1898, embracing 3,213 separate determinations of latitude. The object is to furnish material for investigating the true movements of the earth's axis as shown by the small changes which within the past few years, have been found to take place in terrestrial latitudes. The matter is necessarily of a severely technical character, and as such appeals directly to a comparatively small circle.

Researches in the physical sciences may be said to embrace in a general way two different lines of work—namely, that of the elaboration of hypotheses, and that of careful observation. But however useful and essential the former may be to the general progress of science, these hypotheses are likely to become obsolete sooner or later, while the value of the observation of phenomena increases as time goes on. If we were in possession of a series of observations like this made a hundred years ago, it

would now be of priceless worth for the investigation in question.

The idea of changes in the position of the earth's axis is not a new one. We find it appearing in various forms at different times since the days of the ancient Grecian astronomers. Not many years ago it was much in favor as an explanation of such geological facts as the existence of tropical remains as far north as the arctic circle and beyond. If the axis can be supposed to change, why might not a gradually progressive movement bring the poles into the present equatorial regions, and vice versa? This hypothesis, however, in spite of its attractiveness, has been shown to be untenable; but instead of this slow progressive movement small changes in the position of the axis, periodic in their character, are well established.

One of the first pieces of evidence in this direction, of a tangible nature, was in the publication of two determinations of latitude by the author of the present paper at South Bethlehem, the first from observations made during the years 1876-77-78, the second in 1885-86. The difference of latitude found was nearly $0''4$, an amount between eight and nine times as great as the probable error of the determination. This result attracted some attention at that time, but the explanation of the phenomenon was not found until some years later.

This work was resumed at South Bethlehem in 1888 and has been continued—first at that place and afterwards at the Flower Observatory—with some interruptions to the present time. It now embraces 13,000 determinations of latitude, some 5,000 of which have been made at the Flower Observatory.

The publication before us is in the form of a quarto pamphlet of ninety-two pages, with a large folding sheet showing the seconds of latitude for each individual determination, all being brought together in this form for convenience of comparison. A brief introduction states the plan followed, with a description of the instrument and the wooden building in which it is mounted.

The instrument is the zenith telescope, this being the most satisfactory form heretofore devised for delicate work of this character. This one was specially designed for the Flower Observatory, and is considerably larger than usual, the aper-

ture being four inches and the focal length forty-eight inches. Experience in its use seems to indicate that such an instrument of even larger size need not be unduly cumbersome. An aperture of six inches with a focal length of seventy inches would probably be found very satisfactory. A full account of the investigation of the levels and the micrometer screw follows, with determination of the progressive errors and correction for change of temperature.

The selection and reduction of a suitable list of stars is a matter of much difficulty. For the application of the method, pairs of stars must be selected from the catalogues fulfilling the following conditions: for each pair the two stars should pass the meridian within an interval of eight or ten minutes. One must culminate north of the zenith, and the other south, at as nearly as possible the same zenith distance. The difference should not much exceed $15'$ of arc. The two stars should not differ greatly in magnitude. The zenith distance should not much exceed 20° . About ten such pairs constitute a single group. Additional requirements are that the separate pairs must follow each other in reasonably close succession, so as not unduly to prolong the time required to observe the group; and that the instrumental corrections should be as often plus as minus, so that they may be practically eliminated from the final result. An ideal list fulfilling completely all of these requirements is like most ideals, unattainable, but instead there must be much balancing of advantages against disadvantages, with more or less satisfactory compromises. The list finally adopted is given on pages 11 and 12. It comprises four groups, three of ten pairs and one of nine. An average of two hours actual observing is called for with each group. The separate groups are so distributed that one is observed in the early evening, the other in the morning. The intervals between the separate groups are six hours for the long nights of winter, with only two hours four minutes for midsummer nights.

The details of the observation and reduction with instrumental and other corrections, followed by the resulting value of the latitude, occupy pages 16-74. After this is the discussion of results. The following is a brief summary of the values found for the latitude :

LATITUDE = $39^{\circ} 58' +$

		Seconds of Latitude.	Number of Obser- vations.			Seconds of Latitude.	Number of Obser- vations.
1896, Oct. 1-Oct.	25	1.898	137	1897, Sept. 8-Sept	28	2.298	90
Oct. 26-Nov.	9	1.918	109	Oct. 4-Oct.	14	2.310	104
Nov. 13-Nov.	27	1.867	142	Oct. 15-Nov.	4	2.101	92
Dec. 14-Jan.	11	2.063	108	Nov. 26-Dec.	10	2.144	119
1897, Jan. 23-Feb.	4	2.056	118	Dec. 12-Dec.	30	2.025	84
Feb. 7-Feb.	25	2.034	104	1898, Jan. 1-Jan.	24	2.038	73
Feb. 27-Mar.	14	2.153	134	Jan. 31-Feb.	8	1.997	107
Mar. 16-Apr.	20	2.222	100	Feb. 10-Feb.	28	2.124	121
May 7-May	21	2.252	125	Mar. 1-Mar.	14	2.037	111
May 22-June	2	2.270	143	May 9-May	30	2.203	125
June 18-July	4	2.271	87	May 31-June	10	2.211	135
July 5-July	24	2.239	134	June 21-July	2	2.214	88
July 29-Aug.	7	2.241	118	July 3-July	16	2.304	136
Aug. 11-Aug.	26	2.280	142	July 29-Aug.	16	2.335	127

It will be noticed that the latitude was near a minimum at the time when the work began. It advanced slowly to the maximum about one year later, the descent to the minimum (about February 1, 1898,) being much more abrupt. From this point it again proceeds somewhat deliberately toward the second maximum, which it appears to have reached at about the time when this series terminates, (August 16.) When irregularities are smoothed out, we have a total range of $0''43$ or 43 feet as the amount of change in the position of the North Pole.

The actual path of the pole can only be determined by combining results of observations in different parts of the earth. It may be remarked in this connection that the results of the past ten years' observations in various places indicate that, if a circle with a radius of thirty feet be described with what may be called the "mean position" of the pole as centre, the actual pole will always remain within this circle; but in its movements it describes a complicated curve, the exact law of which is considerably uncertain, and the physical cause of the movement still more so. At present the most useful work which can be done in the way of solving the problem seems to be that of finding by patient labor exactly what these movements are, and when these are known, we may hope that the resources of our mathematical and physical sciences will be equal to the task of assigning the true cause of the phenomenon.

An interesting by-product of this series is an independent determination of the constant of aberration. This, it may be

explained, is the apparent shifting which takes place in the position of a star in consequence of the combination of the velocity with which light comes to us from the star with that of the earth, in its path around the sun. As an entire year is required to complete the cycle, part of the observations on which a determination of the value depends must be made in winter, and others in summer. The different conditions of temperature tend to produce a much wider range in the value deduced than theory would lead us to anticipate. For the purposes of the latitude investigation, the resulting uncertainty in the aberration is of little importance. As the displacement at the time of the evening observation is opposite in direction to that in the morning, the mean is therefore practically free from error due to this source. On the other hand the difference between the evening and morning latitudes gives the means of determining what correction the assumed value of the constant of aberration requires. The value assumed is that of Struvé, $20''4451$; value given by this series, $20''580$.

The difference is larger than we should expect; but an inspection of the following recent determinations of this constant will give some idea as to the present uncertainty regarding its value.

Davison	$20''.482$
Preston	$20''.433$
Fergola	$20''.533$
Rees	$20''.457$
Doolittle, 92-93	$20''.552$
Finlay	$20''.57$
Küstner	$20''.313$
"	$20''.611$
Hall	$20''.60$

This list is by no means exhaustive, but merely gives a few values by way of illustration. Evidently the explanation of these discrepancies will demand careful attention before we can feel satisfied that our knowledge of this important constant is sufficiently precise to meet the demands of the science of to-day.

**RÉSUMÉ OF PROCEEDINGS OF THE TWELFTH INTERNATIONAL
CONGRESS OF ORIENTALISTS.**

Professor Morris Jastrow, Jr., returned on the second of November from Rome, where he had been in attendance at the Twelfth International Congress of Orientalists, as the representative of the University of Pennsylvania and one of the delegates also of the United States Government. Professor H. V. Hilprecht, who also had been appointed to represent the University, was prevented from attending.

The Congress opened on the evening of the third of October, in the Hall of the University of Rome, and after the formal organization had been accomplished, a reception was tendered to the visiting delegates. Over five hundred scholars had registered as in attendance, and in addition several hundred persons from all parts of the world, who were more or less interested in Oriental studies. The delegates included distinguished scholars from every European country, from America, and quite a number of representatives of institutions of learning in Egypt, Persia, India, China and Japan.

On the morning of October fourth, the formal opening of the Congress took place in the Capitoline Museum. The meeting was presided over by the Minister of Education, Baccelli, who represented His Majesty, the King of Italy. Formal addresses of welcome and greeting were made by the representatives of the various countries represented, Professor Haupt, of the Johns Hopkins University, responding on behalf of the United States.

In the afternoon, the real work of the Congress began. The large number of subjects embraced was divided into eleven sections. Among these were sections for Sanscrit, for Iranian languages, for Semitic languages, the Mussulman civilization, the relations between Greece and the Orient, and for the geography of the East. Two new sections were added; one for American languages, and the other for the religion and mythology of the East. The sessions were held in the lecture rooms of the University in the morning and afternoon. The number of papers presented was unusually large, so that in some sections the time for the reading of them had to be limited; but inasmuch as these papers will all be published, scholars will

eventually reap the benefit of the work prepared for the Congress.

Of the American scholars present, Professor Haupt read several papers, among them being one on the Seraphim and Cherubim ; Professor Jackson, of Columbia University, laid before the Congress a plan for a dictionary of the Avestas, which he is about to undertake in co-operation with Professor Geldner ; while Professor Jastrow read a paper embodying an examination of a Semitic Stem, and proposing a new interpretation of the name of Samuel.

The International Congress, apart from its scientific value, offers an opportunity for scholars to come together and formulate plans for scientific research. Among the projects introduced at this Congress was the formation of a society to advance the study of the Sanscrit Epics. Another important project launched by the Congress was the publication of an encyclopedia of Mohammedanism, prepared on an extensive scale. A specimen of the work was laid before the managers of the Congress, and the committee of publication, with Professor Houtsma, of Holland, as editor, was authorized to proceed with the work.

An interesting subject that came up in discussion before the Semitic Section, was a question which is now occupying scholars in all parts of the world, as to the real character of the recently discovered fragments in Hebrew of the book of Ecclesiasticus (or the "Sayings of Sirach"), which until lately was known only through a Greek translation of the original Hebrew, made by the grandson of the author in the year 132, B. C. Professor Schechter, of Cambridge, was the first to discover fragments of what appeared to be the original Hebrew. The discovery practically involved the addition of an original work to Old Testament literature. About a year ago, however, the question was raised by an English scholar, as to whether these Hebrew fragments actually represented the original, or were not a retranslation from the Greek, or from a Syriac translation of the Greek. This important problem is now engaging the attention chiefly of English, French and German scholars. At the Congress both sides of the controversy were represented, the prevailing sentiment being that the time was not ripe for

pronouncing a definite decision. New fragments have recently been found, and have just been published by Professor Schechter. A careful examination of these may throw further light on the controversy.

The social features of the Congress were exceedingly pleasant. They included an interesting excursion to Tivoli, where lunch was served, and in the afternoon a visit paid to the remarkable ruin known as the Hadrian Villa. Special arrangements were made on another day for a thorough visit to the Roman Forum, under the superintendence of scholars and guides designated for the purpose, and an afternoon tea was given in the ruins of the so-called "palace of the Cæsars."

The government officials and private citizens assisted in making the stay of the delegates a memorable one. Among others, the Minister of Foreign Affairs gave a reception to the delegates, and an evening's entertainment was furnished by Monseigneur Marini, who presented to the delegates the greetings of the Pope.

The Congress closed with a large banquet at the Hotel de Russie on the evening of the fifteenth of October, which was attended by about one thousand persons. The Minister of Education presided at this banquet, and a number of addresses were made, in all of which a tribute was paid to the labors of the executive committee which had the Congress in charge. The Congress united in drinking to the health of its distinguished president, Professor Angelo de Gubernatis.

The next Congress will be held in 1901 or 1902 in the city of Hamburg.

NOTES.

Architecture :

The thesis of Professor Frank Edson Perkins, now of the Architectural staff, was admitted to the Spring Exhibition at the "Old Salon," Paris, held at the Champs Elysées Palace, and received an "Honorable Mention." The exhibit each year contains a selection of the more important contributions from the graduates of L'Ecole des Beaux Arts (Architectural Section), and the award thus made is, it is believed, a recogni-

tion not hitherto accorded to the work of an American architect.

Mr. Amos J. Boyden, for some time past Lecturer on Building Construction, has received a government appointment as Superintendent of Construction of the new U. S. Mint now building in Philadelphia. The appointment followed a rigid civil service examination. Mr. Boyden will remain with the University in the capacity of Lecturer in Architecture.

English Literature.

The thesis presented by Raymond M. Alden (late Senior Fellow in English on the Harrison Foundation, and now Instructor in English) in partial fulfillment of the Ph. D. requirements, will appear shortly as one of the University publications in the Series in Philology, Literature and Archæology. Its title is "The Rise of Formal Satire in England under Classical Influence."

Professor F. E. Schelling's "A Book of Seventeenth Century Lyrics," in the Athenæum Series is now in press. It is concerned with the period from the accession of Charles I. (1625) to the death of Dryden (1700); and contains, along with the text and notes, an introduction treating of the history and development of the lyric within that period.

Germanics :

Dr. Martin Schütze, Senior Fellow in Germanics, offers two new courses during the current academic year. (1) *Storm and Stress*: (2) *The Naturalistic School in Germany*. The first of these courses consists of lectures and required collateral readings; the second, entirely of lectures. Both courses will be open to students of German, as well as to those working in other departments of literature. Both will be credited as graduate work.

Dr. C. W. Prettyman, Senior Fellow, has been appointed Instructor in German at Dickinson College, Carlisle, Pa.

Graduate School.

Several changes have been made in the conditions under which the Harrison Fellowships and Scholarships have been granted

for the past three years, in order to bring those conditions into greater conformity with the recently modified regulations of the Department of Philosophy. Heretofore Harrison Scholarships have been open only to graduates of the courses in Arts and Science of the University of Pennsylvania. They are now open to all baccalaureate graduates of the University of Pennsylvania. The restriction of the eight Harrison Scholarships to eight specified groups of subjects have been also removed, and the scholarships were made scholarships at large, assignable year by year to any subject under the jurisdiction of the Department of Philosophy.

The Harrison Fellowships have heretofore been restricted to persons holding a baccalaureate degree in Arts or Science. Competition for these fellowships has now been thrown open to all persons holding a baccalaureate degree satisfactory to the executive committee.

Library.

An important work in the Library building that has just been completed is the adaptation of the rooms in the upper floors of the building as lecture and seminary rooms for the Graduate School. These floors were, until last spring, occupied by the Museum collections.

The following plan of apportionment was adopted: the large room on the second floor was assigned as a seminary library for the History group, and the groups of Economics, Practical Science, Sociology and Statistics; the two adjoining rooms to be used as lecture rooms for the professors in these branches.

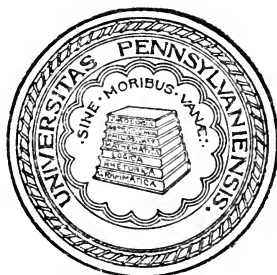
On the third floor, the large room at the south end was set aside to hold the musical library, and also the valuable Dante collection presented to the University some years ago by the late Francis Macauley. In this room Professor Brumbaugh also proposes to meet the teachers' class in Pedagogy. The two adjoining rooms will be used by the professors of Philosophy, Ethics, and Pedagogy, as lecture and seminary rooms. The large room in the third-story-front has been divided into five sections, to accommodate the philological groups as follows: Germanic Languages, Latin, Semitics, Assyrian, and Romance Languages.

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UNIVERSITY CATALOGUE NOTICE.

The University Catalogue for 1899-1900 will appear shortly after January 15, 1900. Beginning with the forthcoming issue, AND HEREAFTER, copies of the Catalogue will be sold at twenty-five (25) cents each, or at thirty-five (35) cents if sent by mail postpaid.

Single copies of the Catalogue will be delivered free of all charges to (1) University officials; (2) colleges and universities; (3) schools; and (4) libraries; also, UPON REQUEST, to (5) alumni; (6) contributors to the University; and (7) to parents or guardians of students. To all others, the Catalogue will be sold.

All applications should be addressed to the Assistant Secretary of the University, 101 College Hall, and should be accompanied by the required sum in money or postage stamps.

PROCEEDINGS OF THE CORPORATION.

At a stated meeting, held on December 5, 1899, the following business was transacted: Resignations were received and accepted as follows: Dr. Robert S. J. Mitcheson, and Dr. Joseph P. Tunis, Assistant Demonstrators of Astronomy; George C. Scheetz, Harrison Scholar in Economics. Dr. Thomas H. Montgomery, Jr., was elected Assistant Professor of Zoölogy; Norman Grey, Lecturer on New Jersey Practice (in the Department of Law); and Raymond DuHadway was appointed Harrison Fellow in Mathematics. Mr. J. Hill Martin presented, through Dr. Ewing Jordan, the medical diploma of his grandfather, William Martin, who was graduated from the University as Bachelor of Medicine in 1786. Dr. George Fales Baker presented the sum of \$5,000 to found a free bed in the

University Hospital, to be known as the "Alfred Gustavus Baker Bed." A formal invitation to deliver the University Day oration was extended to His Excellency, Wu Ting-fang, Chinese Minister to the United States Government at Washington. Thanks were voted to Drs. S. B. Weston, J. M. Grier, S. Weir Mitchell, Caspar W. Miller, and Henry Beates, Jr., for gifts of books to the Library. Announcement was made that a gymnasium for the use of women students had been established at Thirty-ninth and Locust Streets, and that Miss Esther Kuhn had been appointed Instructor therein. The opening of the new Free Museum of Science and Art, and the dedication of the William Pepper statue, was announced for December 20, and adjournment was made to that date.

The stated meeting held on January 2, 1900, was called to order at the offices of the Western Savings Fund Society, in compliment to Frederick Fraley, Esq., senior trustee. The Provost made the following announcements: that Sir Charles Arthur Roe had been duly appointed as a delegate to represent Oxford University at the opening of the new Law School building; that His Excellency, Wu Ting-fang, Chinese Minister to the United States Government, had been pleased to accept the invitation of the Corporation to deliver the oration on University Day, February 22; that the Free Museum of Science and Art had been opened formally on December 20, 1899, and that at the same time presentation had been made of the William Pepper statue, together with a gift of \$50,000 from Mrs. Frances Sergeant Pepper for the maintenance in perpetuity of the Pepper Hall in the Museum; and, that a meeting and banquet of Pennsylvania alumni had been held at Scranton, Pa., on the evening of December 27, 1899. The Standing Committees of the Corporation were reappointed as constituted during the past year, and similar action was taken as regards the representatives of the Corporation in the Board of Managers of the Wistar Institute of Anatomy and Biol-

ogy. Managers of the Department of Archæology and Paleontology were elected as follows: Daniel Baugh, Robert C. H. Brock, Calvin Wells, Sara Y. Stevenson, Joseph Willcox, William L. Elkins, Clarence H. Clark, Justus C. Strawbridge, John Sparhawk, Jr., Professor Maxwell Sommerville, John Wanamaker, Talcott Williams, Joseph S. Harris, William W. Frazier, Samuel F. Houston. Dr. Matthew H. Cryer was advanced to the full Professorship of Oral Surgery. Susan W. Randall was elected Assistant Librarian in the University Library, in special charge of the Cataloguing Department. The title of the Rev. Dr. A. T. Clay was changed from Lecturer in Assyrian and Hebrew to Lecturer in Assyrian and Hebrew and in Semitic Archæology. The die for the new University seal, the design for which was approved at the June, 1899, meeting, was duly presented by the Secretary, and the old die formally broken by him in the presence of the Trustees.

**ADDRESS BY THE PROVOST AT THE OPENING OF THE FREE MUSEUM
OF SCIENCE AND ART OF THE UNIVERSITY OF PENNSYLVANIA,
WEDNESDAY, DECEMBER 20, 1899.**

*Mr. President, Managers of the Department of Archæology
and Paleontology, Ladies and Gentlemen:—*

It gives me great pleasure to receive for the Trustees of the University of Pennsylvania this unique result of the thought, the labors, the generous gifts, of the past six years; and upon your behalf to declare the Free Museum of Science and Art from henceforth open for its scholastic and its public uses.

Mr. Mayor, and gentlemen, members of the Select and Common Councils of the City of Philadelphia: It gives me an equal pleasure to thus announce to the municipal authorities the fulfillment of the pledge made to them when they granted the University this land in trust for museum purposes; and to reiterate the grateful thanks with which the

Trustees received that renewed mark of the civic confidence, without which the erection of this Museum would have been impossible, or indefinitely delayed.

I am sure that in planning this Museum, and in meditating upon its purposes, all who have had to do with it recognized the study of the life of man upon this planet to be a filial duty, and a reverent object of University investigation. We of to-day are what we are, and owe what we are, to those who have gone before us. Our hopes and fears, our purposes and plans, our ability to achieve, our failures as to results, come to us not only from our immediate surroundings, but are the inheritance of a time that is past. We cannot cut ourselves off by any line of cleavage from yesterday, and say to ourselves that we will live for to-day. We are debtors to the past and responsible to the future,—precisely as the child of to-day is interested in and dependent upon the life and character of his parents or his remoter ancestors. We cannot separate ourselves from that history, but must assimilate it in our own lives, and transmit it, with what we have done, to those who are to come after us. And so the duty of the University is to take up the larger question of the history and the daily life of by-gone times. To the University, and to those who are interested in this work, nothing which concerns humanity is alien.

There has been, then, undertaken by the civic interest of these benefactors, the duty of illustrating here the life of man upon this planet; sometimes, it may be, only in broad sketches; at other times, in its minutest details. What has been the history of the progress of the races; what light was shed upon their pathway; how they dealt with one another; or what was their progress in the arts of life? Is it nothing to one who passes by that here you may see the door-socket of the temple of Baal, at Ur of the Chaldees, where Abraham worshiped before he went into another country; not knowing whither he went? Is it

nothing to you who pass by, that, at the time when this man was showing his faith by taking his flocks and herds from the Euphrates Valley to the shores of the Mediterranean, there was one also in Egypt to whom the witness had not been vouchsafed in vain, but whose heart responded to the rain from heaven and the fruitful seasons? So that there was inscribed upon that Egyptian's resting-place such an epitaph as this: "I did that which was right. I hated evil. I gave bread to the hungry and water to the thirsty; clothes to the naked; succor to him who was in need. I harmed not a child. I injured not a widow. There was neither beggar nor needy in my time; none went hungry. I did that which was pleasing to my parents. My door stood open to him who entered from without, and I refreshed him."

Such records as these—elevating to us all—are their own great reward. And yet, they represent periods so late in human history that we may call them almost "modern" events. Far back in the history of the world—as far back of this recital as we are on the hither side of it—has part of that history been written in authentic characters, through the work of the Department of Archæology of the University of Pennsylvania. The humanity which has made the whole world kin is proven by what is here deposited; and, naturally, not only what is of good in human nature, but what is of evil. We find the king of Assyria pleading with the king of Egypt for greater gifts of gold, in exchange for precious and rare jewels; but we find the jewels sent in return for the gold from Egypt to be but glass, colored adroitly through chemical processes. We find the children of Babylonia amused as if in the nursery of to-day. There is the Noah's Ark, with the mother and the litter of young dogs, and there the child's rattle of clay. Do we seek to know of the recreations of the people, we find identically the same games in every part of the world, going far back of any time at which there is the slightest

knowledge of any intercommunication. Does music charm, or sculpture and painting ennoble? Here we have instruments of music, the paintings of the Greek in Egypt, and the sculptures of Nineveh. If we watch to-day the course of foreign exchange, the rates of money and the transactions of the market-place, so we may investigate and know the daily life of merchants 2,500 years ago. We have here their libraries, their books of accounts. We know the basis upon which, as real estate agents, they took care of properties; the obligations which were incurred for the planting of trees; the irrigation of land; the rates of interest upon which money was loaned. And as we know what their interests were in childhood and in manhood, so we can follow them to the grave, and show here the coffins in which their bodies were laid to rest.

Nor have these men and women gone only to the remote East for additions to the fund of knowledge—the East, which is in fancy called “the cradle of the race,”—but they have come West, and further West. Here you will find the history of Northern Italy, at a time when the “Twin Brothers” were nursed upon the hills of Rome, whose thatched hut was sacredly kept as an archæological treasure for so many years amidst the palaces of the Cæsars. From North and South America the collections are no less rich; but it is one of the curious facts in archæology that while the chronology of the East may be ascertained with reasonable accuracy by comparative facts, the chronology of the Western Hemisphere is not easily determined. We cannot tell, then, at what precise date those “Cliff-Dwellers” lived, whose life is illustrated here in the most perfect way, untouched by any foreign contact. We can only know that before any records of our history begin, that tribe had long since passed away.

Time would fail me to tell of what has been accomplished here in these six years. The collections from Peru; the stone implements; the ethnographical collection

from Borneo—certainly the most perfect in any museum ; religious objects from Japan ; from Thibet ; from the Malay Peninsula ; from the Philippine Islands ; costumes of former days ; fans of royal quality, decorated by the greatest artists ; bronzes ; and coins—which had their then use as tokens of exchange, but now have their significance as being inscriptions of historical facts of the highest value, because unquestioned. So that there have been brought here, from every point of the compass, the beginnings at least, and, in many respects, the completed collections of the history of the world, from quite six thousand years B. C., to us—the inheritors of eight thousand years of history.

That upon this great subject of archæology, Philadelphia and the State of Pennsylvania should not be overlooked by New York and the greater capitals of Europe, was the purpose of the late president of the Department of Archæology and his earnest co-workers.

You, sir, have depicted the activity and unfailing resource of the man whose statue is to-day uncovered and presented in perpetuity to the University of Pennsylvania. That activity was the record of his life from his early boyhood. When a college lad, he was always making memoranda upon his tablets (with the little pencil which he kept in his vest pocket), of things to be accomplished, and as often crossing them off with the same pencil, when accomplished. But the tablet was never erased : it was always full, so fast did new things follow upon the old.

The Trustees of the University were glad to assign to his statue so public and prominent a site, and one so near to the latest object of his creative purpose. There have been inscribed upon the records of the University—in final and imperishable ways—the record of his service, and the tragedy of his death. Far from home—a continent separating him from those who were nearest to him—a torrent of irrepressible tears preceded the breaking of his heart.

From his childhood to his grave, how restless—how eventful a life! Well adopted was his motto: "Repose elsewhere!"

And what shall I say in fulfillment of the last and tenderest duty? I transmit with sad satisfaction, to the Trustees of the University of Pennsylvania, the deed of gift which is now so generously offered—a gift of fifty thousand dollars towards the endowment of the Hall—known as "The William Pepper Hall" in this Museum Building—doubtless, the realization of the purpose of Dr. Pepper, defeated by his sudden death.

There can, I know, be no greater happiness in the use of wealth than that which is to come from the safe-guarding of one's fondest recollections. The gentle words in which you, sir, have spoken, have already found their echo in every breast—for, in her absence, we may say with propriety that no more chaste and gentle heart ever beat within our borders;—and this gift may bear with it a practical significance of deepest moment.

We are too apt to accept such accomplishments as have formed the basis of the occasion of to-day as if they came of themselves. They represent, as some of us too well know, constant work, disappointment often, chagrin often: sometimes not only want of sympathy, but a sneer;—and too seldom the willing response which alone makes a great University, or any of its great departments, possible in amplest measure.

This department, with all its treasure and deposits, represents almost exclusively work done in every part of the world at private cost, and a work which can only be continued and advanced by private help.

Here the public may come and go at ease. Here "Prue and I" may have their place with those who can travel wherever their desires may tempt them. May I not ask, then, in some appropriate way, that, as this great assemblage has gathered here, to-day, to the dedication of the

building, to the unveiling of the statue and to hear the tidings of Mrs. Pepper's offering—so the day may mark the heartfelt interest of a great community in enriching the endowments and in making easier in the future than it has been in the past, the task of those whose presently completed work is now offered and accepted.

THE NOVEMBER METEORS.

The failure of the November meteors to appear in the brilliant and dramatic manner which prediction had led the general public to anticipate, was disappointing to all concerned. Although those who are familiar with the technicalities of this department of astronomy are well aware of the somewhat vague and uncertain character of the data on which prediction must be based, there was much reason for expecting a repetition this year of the famous displays of 1833 and 1866. We cannot at present say precisely how it came about that these expectations were disappointed, but doubtless the answer to the question will be given in due time.

It is not, however, correct to speak of the predicted return of the Leonids as a failure. The meteors did appear in due form at the time announced, but not in the numbers expected. At the Flower Observatory preparations were made for keeping up a continuous watch of the heavens on the nights of the thirteenth, fourteenth, and every night following as long as the shower lasted. A partial watch was maintained for a time on the morning of the thirteenth, but as very few meteors were seen it was discontinued. It was part of the original plan to plot the paths of such bright meteors as might seem to be best suited to the purpose, but owing to the fewness of such objects and the difficulty of locating the trails in the presence of the full moon, this part of the program was not carried out. Practically nothing could be done before midnight, the radiant being below the horizon in the early evening. The results are as follows:

On November 13-14 there were from three to five observers

on the watch continuously from midnight to 5.40 a. m.: Number of Leonids counted, 123. Number of non-Leonids, 46. There was a decidedly regular increase in the numbers counted; during the first hour only 4 Leonids being recorded, while during the last hour there were 45. This increase was due in part, at least, to the more favorable position of the radiant, and the approach of the moon to the horizon. On the 14-15 the night was entirely cloudy. November 15 and 16, from four to eight observers were constantly on the lookout, and 63 Leonids and 26 non-Leonids were reported. Until about 2h. 30m., haze and light clouds interfered seriously. Twenty-eight Leonids were counted between the hours of 4 and 5 a. m., when the conditions were fairly good.

On November 16-17 most of the students in Astronomy at the University participated in the watch, but from the meagre results obtained it was obvious that the maximum of the shower had passed. Only 24 Leonids were counted between midnight and 4 a. m., when clouds interfered and the work was discontinued. As far as can be inferred from the above numbers, it seems probable that the maximum occurred sometime during the day or night of the fourteenth, when observations in this vicinity were prevented by clouds.

THE UNIVERSITY VIVARIUM.

The University Vivarium, which has recently been completed, is a substantial brick building 61x33 feet in size, located in the Botanic Garden and connected with Biological Hall through the system of greenhouses. Though small in size, it contains provisions for a great variety of animals.

The aquarium room is the largest in the building, as a proportionate representation of the different groups of animals requires, and contains five pools and twelve large aquaria, with a total capacity of nearly ten thousand gallons. There are also tables provided with running water for small aquaria, and for hatching the eggs of fishes, frogs, crustacea, etc. The pools and aquaria are built in the ground, being constructed of brick and cement, thirteen of them having glass fronts on an

aquarium grotto, which receives light only through the aquaria, the latter being lighted from above by skylight. One pool and four aquaria are designed for sea water, and will, when fully stocked, contain a variety of marine animals. The salt water is pumped from a large cistern into the aquaria, from which it overflows through a sand filter into the cistern again. The water is lifted by compressed air, the conducting pipes are of rubber and terra cotta, and there is no metal anywhere in the system. It is believed, therefore, that a single supply of sea water may be used indefinitely.

The fresh water aquaria are all supplied with filtered water, and are fitted up so as to provide for animals which frequent rocky, sandy, muddy and littoral habitats. In addition to the aquaria, there are also terraria for snakes, lizards, tortoises, newts, snails and insect larvæ; formicaries and observation hives for the study of ants and bees; and insectaries for various insects: while one room has been fitted up especially for birds and bats, and another for amphibians, reptiles and small mammals. It will thus be seen that provision has been made for keeping at least a few representatives of almost every class in the animal kingdom, although most of the animals will be small, many being microscopic in size.

The Vivarium opens a new field for teaching and research. The principal lines of zoölogical inquiry may be classed as morphological, physiological and œcological. While universities have given much attention to the first two, as shown by the usual courses in anatomy, histology, embryology and physiology, no systematic attempt has yet been made by any institution, so far as known, to give instruction and conduct research in œcology. And yet there can be no doubt that the problems of œcology are of as great scientific importance, and of greater popular interest, than those of morphology and physiology. The usual laboratory work in zoölogy, viz: the anatomy of a few alcoholic specimens, is less than one-half of the science, and in all respects the least interesting and important half. The study of living animals; their development under normal and experimentally altered conditions; their food, rate of growth and duration of life; their enemies and friends, parasites and messmates; their mating, breeding and care of

young; the effects of isolation, crossing and close breeding, on structure and habit; the effect of varying food, light, color, temperature, salinity, etc., on the color, size and structure of every part; the daily and nightly activities of animals; the origin and nature of peculiar habits and instincts; the study of animal states and of comparative psychology,—in short the study of all the varied ways in which animals live and adapt themselves to their environment, is an integral part of zoölogy: and who can doubt that together these things form its most important part? We are to be congratulated, therefore, on having such excellent opportunities for the prosecution of this important branch of zoölogy.

At present the Vivarium is the most complete of its kind in the country, and so far as known, the first in the world to be maintained *as a part of the zoölogical equipment of a university*. Of course, almost every zoölogical laboratory has its rooms for live animals, but these are usually a few poorly lighted rooms in the cellar, where a small number of animals, chiefly mammals, are kept for purposes of dissection or physiological experiment. A few institutions have excellent provisions for keeping and studying a single group of animals, as for example, insects or birds; but no where else has any zoölogical institute attempted to bring together for purposes of observation and experiment representatives of every great group in the animal kingdom.

There are of course many zoölogical gardens and public aquaria where great numbers of animals, chiefly vertebrates, are kept for purposes of exhibition, but which are not available for scientific observation and experiment. In such places extensive provision is made for the casual visitor and sight-seer, but little for the scientific investigator. Such gardens and aquaria, while of great popular interest and value, have contributed relatively little to the science of zoölogy.

The plans and purposes of the new Vivarium are more like those of the zoölogical stations of this country and Europe than they are like any other type of institution. These zoölogical stations, both fresh water and marine, have added enormously to our knowledge of animals since the first of them was established about thirty years ago. Such stations must be

located at favorable points on the sea coast, or on inland lakes and rivers, where the animals to be studied are most readily accessible; and for extensive zoölogical work, whether in the nature of surveys, collecting, or in many kinds of observation and experiment, such a method is the only one possible. In the University Vivarium, on the other hand, instead of going to distant points to carry on work, the attempt is made to bring a certain number of animals from various localities to the University, where much the same type of work as that done at the zoölogical stations may be prosecuted. As compared with great stations, such as those at Naples and Wood's Holl, the facilities here for work on marine animals are very meagre; and the same is true of the facilities for studying limicolous and terricolous forms as compared with those which are offered by many fresh water and agricultural stations. Nevertheless, a surprisingly large number of animals can be kept in the Vivarium; and, since the scientific value of animals is not measured by their size, but is often in inverse relation, we find that the available problems already housed in the Vivarium are sufficiently numerous and important to keep a whole generation of investigators and students closely occupied.

Although the Vivarium is at present but partially stocked, it has nevertheless demonstrated its usefulness in both teaching and original research. A new course of study on general zoölogy, with especial reference to living animals, is given this year for the first time, with gratifying results. This course is designed primarily for those who are teachers, or who propose to become teachers of zoölogy, and it is hoped that it may contribute somewhat to the establishment of a new and better type of zoölogical teaching in secondary and preparatory schools.

The following subjects of investigation are at present being conducted in the Vivarium:

1. Conditions which determine sex in rats and mice.
2. Influence of a previous sire on subsequent progeny of rats and mice.
3. The influence of inoculation with the germs of various diseases on the fertility of rabbits and guinea pigs.
4. The instincts and associative processes of young chicks.

5. The rate of growth of tadpoles under varying conditions, and the influences which determine the sex of frogs.

6. The causes of the two-color varieties of the common newt.

7. The structure, development and habits of the fresh water worm, *Manyunkia*, all of whose relatives are marine in habitat.

In addition to these subjects of investigation, which are limited by the number of workers rather than by the material at hand, many valuable observations are being made on the habits and life histories of a considerable number of animals. Of course, there are many necessary limitations in the scope and difficulties in the development of such an enterprise; but it is safe to say that, as a part of the zoölogical equipment of the University, the Vivarium is of the utmost importance, and that it represents a type of laboratory which is certain to become common in the near future.

MEETING OF THE MODERN LANGUAGE ASSOCIATION.

The seventeenth annual meeting of the Modern Language Association of America was held at Columbia University, New York City, December 27, 28 and 29. On the afternoon of December 27, an address of welcome was delivered by President Seth Low, of Columbia, and in the evening the annual address of the president of the Association, Professor H. C. G. von Jagemann, of Harvard University, on "Philology and Purism."

Five sessions were held in the large auditorium of Schermerhorn Hall, where twenty-six papers were read, by title or in full, by members of the Association. Out of this number, six papers treated of subjects belonging to the domain of Romanic languages and literatures, the first being a paper on "The First Centenary of the Birth of Leopardi," by Professor L. E. Menger, of Bryn Mawr College. A paper by Professor H. A. Rennert, of Pennsylvania, was read by title. Other contributions were: "The Round Table before Wace," by Mr. Arthur C. L. Brown, of Harvard; "The Latest Researches Concerning Arras in the Thirteenth Century and Adan de la Hale," by



JOHN ARCHER, Class of 1768, M.

(First Graduate in Medicine of the University
of Pennsylvania)

(By courtesy *Maryland Medical Journal*.)

Professor Rambeau, of the Massachusetts Institute of Technology; "An Incident in the Poëma de Fernan Gonzalez," by Professor Marden, of Johns Hopkins; "The Date of the Rîmed Chronicle of the Cid," by Dr. Bourland, of Michigan University.

One of the social features of the meeting was the brilliant reception tendered to the delegates by President and Mrs. Low, at their home on Madison avenue and Sixty-fourth street.

Professor Thomas R. Price, of Columbia, was elected president of the Association for the ensuing year, and it was decided to hold the next annual meeting during Christmas week, 1900, at the University of Pennsylvania.

A BIOGRAPHICAL SKETCH OF JOHN ARCHER, M. B. *

By One of his Descendants.

John Archer, M. B., was a son of Thomas Archer, a descendant of an English family that had settled in the north of Ireland, whence he emigrated to America with several brothers before the middle of the last century; and after a brief sojourn in Cecil County, Maryland, removed to what is now Harford (then part of Baltimore) County, where his son John was born near the present village of Churchville, on the fifth of May, 1741. Besides farming, Thomas Archer was agent for several extensive iron works in the vicinity. He also drew up indentures for his neighbors, auctioned off goods, etc., and thus acquired a considerable estate. Among his other enterprises, he set up, on his own premises, a skilled blacksmith, which no doubt gave rise to the false assertion that he himself worked at the trade. His wife, Elizabeth (Stevenson) Archer was also of an English family that had settled in the north of Ireland. Of their five children, four were swept off in their infancy by a malignant epidemic, the subject of this sketch barely escaping

[* Presented to the March (1899) Meeting of the Johns Hopkins Historical Club, and reprinted, with some omissions, by permission from the August-September (1899) issue of the *Bulletin of the Johns Hopkins Hospital*. The cuts used in illustration were furnished through the courtesy of the editors of the *Maryland Medical Journal*—ED.]

death from the same disease ; and from him all of the name in Maryland who are in any degree whatever related to the family, are descended.

John Archer was educated in part at West Nottingham Academy, in Cecil County, a school of wide repute, in charge of Rev. Samuel Finley, a learned minister, its founder, who was subsequently called to the presidency of Princeton College. Among his classmates at this academy were two of Mrs. Finley's nephews, Dr. Benjamin Rush and his brother Judge Rush, with the former of whom he enjoyed a lifelong intimacy.

In 1760 John Archer graduated A. B., at Princeton, and A. M., in 1763. Meanwhile, in February, 1762, he advertised that he would open a Grammar School in Baltimore Town. There is reason to believe, however, that this project was never initiated, as he soon afterwards entered upon the study of theology under Presbyterian auspices and progressed so far as to preach his trial sermon—which is, I believe, still extant—but, on being examined for ordination, he failed to pass the ordeal. The record of his examination by the Presbytery of New Castle is worth giving here in full, if for nothing else, as a specimen of human inconsistency as to the time-being, and fallibility as to the future. It runs to the following effect:

“30 Aug., 1764. Mr. John Archer having at last meeting of Presbtery offered himself for Tryals as a candidate for the sacred ministry, then delivered a discourse by way of specimine, on a text that had been assigned him. He was also examined at some length in the Latin, Greek & Hebrew languages, his own experience in religion & on some points of divinity; but [the Pb'y not having time fully to satisfy themselves thought it best not to enter him then on their minutes, & only recommended to him another subject for a discourse by way of specimine. Mr. Archer now delivered said discourse & was further examined on the article of experimental religion. The Pb'y upon solemnly considering the whole, do so far sustain his answers on the several Branches of Examination & particularly said Specimine, as to enter him upon further tryals, & appoint him to compose an exegesis upon the question, “*In quo fundatur obligatio moralis?*” [What is the basis of the moral obligation?] & a discourse on Romans VII. 15. [“For that which I do, I allow not: for what I would, that do I not: but what I hate, that do I.”]

“6th Dec., 1764. The Pb'y proceeded to hear the exegesis given to Mr. Archer by our last, & further examined him on Logick, & asked him some questions on Divinity; & on the whole, unanimously judge that though we would gladly encourage youths who offer themselves for the

sacred ministry yet think Mr. Archer through the whole course of his tryals discovers such a want of knowledge in divinity & the other particulars he has been examined on, as well as such an incapacity to communicate his ideas on any subject, y^t we cannot encourage him to prosecute his tryals for the Gospel ministry any further."

Now, it is evident from the record itself that the candidate, in the opinion of the Presbytery, was well versed in all the essential branches except as to some points of the denominational creed. And as to his "utter incapacity to communicate his ideas on any subject," it is a sufficient answer to say, that the Presbytery had just declared, as the record runs, that he was particularly satisfactory in his discourse or sermon before delivered.

Colonel Nathaniel Ramsay, the hero of Monmouth, is authority for the statement that he was present when John Archer underwent his trial before the Presbytery; and that his failure of ordination was "because he did not give entire satisfaction on some doctrinal points." *

In the spring of 1765 he became a pupil of Dr. Morgan, who, in the following November, began the initiatory course of medical lectures in Philadelphia College, with Dr. Shippen as his colleague,—these two being the founders of the department of medicine in that institution, afterwards the University of Pennsylvania.

About this time he wrote as follows to his future wife:

" . . . I am daily at Dr. Morgan's shop, & on Mondays, Wednesdays & Fridays attend his Lectures—the Course is four Pistoles & a Dollar. Tuesdays, Thursdays & Saturday's Dr. Shippen's—the course, six Pistoles . . . I have concluded to remain in Philadelphia until Spring come a year."

On the sixth of April, 1767, he wrote to his wife:

" . . . It will be some time before I can go down [to Maryland.] Dr. Morgan's Lectures will not begin before May 20th, & I am determined to hear them to the last. Dr. Bond's will not begin until y^e last of May.† However, I shall not wait for his. . . . Dr. [Robert] Harris

* Colonel Ramsay made this statement to my father, Dr. Robert H. Archer, one of John Archer's sons, who at that time was his family physician and who communicated it to me.

† Dr. Thomas Bond at this time delivered clinical lectures at the Pennsylvania Hospital. In May, 1768, he was elected to the chair of clinical medicine in the new institution.

has taken Dr. Bayard as a partner in the drug business & Practice of Physic.”*

April 21, 1767, he writes to the same:

“ . . . All prospect of entering into partnership with Dr. Boyd of Lancaster is vanished. Therefore I still have the wide world to seek where to pitch my tent.”

In the summer of that year—between his second and third course of lectures—he proceeded to put into practice, among the denizens of New Castle County, Delaware, the professional knowledge which he had acquired. He, no doubt, gave this locality a temporary preference over the place of his nativity merely because it was much more convenient to Philadelphia, where his medical education was yet to be completed. His ledgers show that during his two years residence in Delaware he attended 212 families, receiving for his services about \$1,000, nearly three-fourths of it in money—the remainder in rent, produce or labor, including the work of mechanics. About one-third of them paid nothing at all. There is, in his ledger, kept while practising in Delaware, a prescription, which, though a little humiliating, it is the duty of the faithful biographer to record. It may perhaps be condoned, for the reasons that it is the only one of the kind in all his ledgers, and that it antedated his diploma—though, truth to say, only a few days.

The entry runs in this wise:

“Rev. Mr. Elihu Spencer Dr. 1768 June 6th
Milleped : pp^t for your Daughter.”

This, of course, was to be taken in one dose ; and there being no other prescription entered for that particular patient, though the attendance upon the family was quite extended, it is fair to infer that it either killed or cured. At that date such revolting prescriptions were nearly out of vogue, though once an every-day matter. Dr. Buckler Partridge, who came from England and practised in what is now Harford County, Md., from 1715 until about 1750, was wont to dose his unfortunate patients—as his prescription book still extant amply shows—

* Dr. Robert Harris was a brother of Dr. John Archer's wife. He was a very prominent member of the profession.

not only with millepedes, but with "juleps of goat's blood," "powdered bees," and "dried viper's flesh;" and, as if these were not enough in themselves, his favorite vehicle for conveying them into the wretched patient's stomach, was a copious draught of nauseating "frog-spawn water." And yet Dr. Partridge was the leading physician of his day thereabouts. Even "Hooper's Medical Dictionary," a standard work of only fifty years ago, contains the following prescription, which, for sheer loathsomeness may perhaps be said to exceed them all: "For very obstinate jaundice: The expressed juice of 40 or 50 living millepedes given in a mild drink."

After attending his third course of lectures—Dr. Kuhn having meanwhile been added to the faculty—the degree of Bachelor of Medicine was conferred upon him and nine other students on the twenty-first of June, 1768. This being the first occasion in America of the conferring of a medical degree, it was to be expected that even under ordinary circumstances some contention would arise as to who should be the recipient of the very first honor of the kind in the new world. Unfortunately in this particular case the decision was greatly complicated by the fact—which soon became known—that the faculty of the College, most of whom had been educated in England, wished to show their respect for the mother country by conferring the first diploma upon the only Englishman among the candidates—Jonathan Potts. But, with the recent attempted humiliations of the odious stamp-act fresh upon their memory, the glorious nine regarded this loyal concession as a downright insult. After a vain protest, they threatened to demand certificates of their successful examination,—armed with which, they would secure the coveted parchments from the neighboring College at Princeton. That settled the question. The thought of losing all except one of their graduating class, and he a foreigner, was more than the intensest loyalty could have endured. The rebels were told to arrange the matter among themselves. This they did by compromising upon the alphabetical order. It may seem a little strange that this was preferred to a decision by lot,—usually the fairest way in such cases. There is little doubt, however, that they were afraid a trial by lot might possibly give the prize to the Eng-

lishman, after all their contention; whereas, by the alphabetical plan, as they must have known at a glance, this was impossible. It is greatly to their credit, however, that they generously allowed him to come in several grades higher than he would have attained by the plan agreed upon if strictly observed,—the following being the order of graduation as given in the official catalogue: "John Archer; Benjamin Cowell; Samuel Duffield; Jonathan Potts; Jonathan Elmer; Humphrey Fullerton; David Jackson; John Lawrence; James Tilton, & Nicholas Way."

Declining an offer of partnership kindly extended to him by his preceptor, Professor Morgan, Dr. Archer returned to his native county in July, 1769, where he practised his profession for nearly forty years. These duties, however, did not prevent him from taking part with characteristic energy in the great struggle for liberty. He was chosen in November, 1774, a member of the first local Revolutionary Committee and of the several successive committees, until August, 1776. Meanwhile, in December, 1774, he enrolled the first militia company of the county, was commissioned its Captain and drilled it regularly until called to other duties in the patriotic cause*—though forced to use a speaking-trumpet, his voice having been permanently reduced to a hoarse whisper by a severe throat disease. The sword which he wore on these occasions is still in possession of a branch of the family. But the trumpet is long since lost, or mouldered away. For many years his sons were wont, on every fourth of July, to bring it down from among the rubbish in the old garret of "Medical Hall" and make the premises ring with the reawakened notes of Independence.

In January, 1776, he was commissioned Major of one of the local Battalions of Militia.

In August of the same year he was elected a member of the convention which framed the Constitution of the new State and the Bill of Rights.

In 1777 he was appointed one of the Commissioners of Peace for Harford County, who constituted the County Court, and

* I have often heard my father state the facts above given, which he had from his father, the subject of this sketch.

held the office for thirteen years, when the court was reorganized on a different basis. During part of this time he was also one of the Judges of the Orphans' Court.

In November, 1776, he was chosen as an Elector of the State Senate—the senators being then chosen by an electoral college.

During all this time, as his medical ledgers, 'still extant, amply show, he practised his profession, not only throughout several counties of his native State, but also in the adjoining State of Pennsylvania.

After the Revolution he devoted himself exclusively to his professional duties. Facilities for acquiring a knowledge of the medical profession being then extremely meagre, students from far and near placed themselves under his tutorage. He built a substantial stone office a few steps from his residence, "Medical Hall," and for a quarter of a century it was seldom that half-a-dozen young men were not under his instruction, one or more of whom, after a certain course of reading, would accompany him on his tedious professional rounds, hearing from him veritable clinics at the bedside, and on their return compounding under his directions the necessary prescriptions. After a longer apprenticeship, he entrusted exclusively to their care the less obscure and complicated cases, whose symptoms they noted and reported to him. Indeed, but for their subsidiary aid, he could not possibly have done justice to one-half the patients under his care. In several of his ledgers the visits and prescriptions of his various students are noted by their initials. From 1790 to 1794 thirteen students are thus noted, most of whom were afterwards in active practice in various parts of the country. And there were probably others. His students formed the first medical society of Harford County, which met at stated periods in the office at "Medical Hall." Some of the papers read on these occasions are to be seen, in manuscript, in the library of the Medical and Chirurgical Faculty.

In 1797 he was chosen Presidential Elector at large on the Jefferson ticket.

He and his son, Dr. Thomas Archer, were charter members of the Medical and Chirurgical Faculty, January, 1799. In

the following June he was chosen one of the Examiners; and in 1802 and 1803 was on the Executive Committee.

In May, 1799, he wrote,* “. . . Some person without my Knowledge hath published that I am a Candidate for the important Place of Elector of the President. It is not my Wish, as I am certain a popular Character in Baltimore county would have a greater Chance than I could be expected to have.”

In 1800 he was elected a member of Congress; and two years later he was re-elected. While a member of that body the physicians of Washington and vicinity availed themselves of his professional advice in cases which had baffled their skill. It was at this period that he discovered the interesting fact, that in the early stages of whooping-cough, vaccination will so modify the disease that its course is rendered comparatively harmless, even in winter. He also contrived and used, in cases of fractured femur, the apparatus which afterwards became famous as “Physick’s modification of Desault’s apparatus.”

On the expiration of his second congressional term he resumed the practice of medicine. But the following, from one of his letters written at the seat of government, in April, 1802, more than hints of the strong man’s failing vigor: “I shall be a very valetudinarian, and in my old days begin to investigate what will best agree with me, who once knew no difference in any kind of diet; who could eat anything without fear that was suitable for nutrition. But those days are gone with the days before the Flood.”

A few years later, partial paralysis, the sequel of an attack of rheumatism following a severe fall, unfitted him for the discharge of his professional duties. He relinquished all active pursuits and his health gradually declined. The end came on the twenty-eighth of September, 1810, when he expired suddenly, in the seventieth year of his age, at his home, while sitting in his easy chair,—an asthmatic ailment for some days before his death precluding a recumbent posture.

* All the letters quoted from in this sketch, unless otherwise noted, are addressed to the subject’s son, Dr. Robert Harris Archer.

A marble slab over his grave in the burying-ground of the Presbyterian church at Churchville gives merely the dates of his birth and death. Of that church he was a member for nearly half a century.*

Extracts from a few of his letters (some two dozen of which are still extant, written in great haste, nearly all of them to his son, Dr. Robert Harris Archer, then, practising his profession in Baltimore), will give glimpses of him not only as a physician, but as a parent, a Christian, a patriot, and a politician. In a letter of date May 31, 1798, he advances the theory, that—

“While the country in this section, which I distinctly remember as far back as 1750, was covered with Oaks, Willows, Maples, Beeches, Alders, Chestnuts, etc., which are Astringent and Antiseptic, the rain which ran off from their Roots into the Streams & Swamps prevented Sickness, as Salt in the Ocean prevents it. And in proportion as the Country was denuded of these natural Antiseptics, Fevers prevailed. In other words they prevented Putrescence of both vegetables & Insects, which is the Cause of Remittent & Intermittent Fevers. . . . Crowded & dirty Cities are nurseries of Putrefaction.”

“July 12, 1798. . . . The Physicians of Philadelphia & Baltimore now succeed in curing Croup with Rad. Senekæ, though the disease was before almost *opprobrium Medicorum*. But they are so obstinate, they will not acknowledge it, because they were not the first to discover the remedy. I was informed when in Philadelphia that Dr. Kuhn has not lost a Patient since he has used the Seneka. I would, before I close these observations, just remark that the cure could be expedited by dipping a cloth in a hot decoction of the Seneka, to be held frequently near the Patient's mouth & nose, that the vapor may be inhaled & come in contact with the membrana trachealis. This I would not communicate to any of the unbelieving gang—*Si volunt desipi, desipiantur*.”

In a letter without date, but probably written in 1798, he says:

“. . . The proper time for repeating the Cortex Peruviana I have found from experience to be the 7th or 8th day. Dr. Moons [one of his former students], in his Thesis [at the University of Edinburgh], has not given me credit for this practice, as he should have done. It is not to be

*Of him, Dr. Mitchell of New York, said: “He left the world full of years and full of honors. His life was fully devoted to the service of his fellow-creatures and to the glory of the great Redeemer. As a physician he was beloved in a peculiar manner by all who knew him. His early piety, ripening into maturity with his years, enabled him to meet death with persuasion of his acceptance with God.”

found in any practical work before that date, unless in a very vague way—no precision is determined—no time set apart for taking it, to counteract the Return of the Fever.

“This a hasty scribble, & as such you will take it.”

The following was written in September, 1800:

“ . . . I am anxiously concerned for you, dwelling, as it were, in the midst of Death. Such chastisement by Divine Providence should lead the contemplative mind to God & our Saviour. . . . I hope you will be careful to avoid bad company of all Sorts, & when time & the situation of your Patients will admit of it, you will, on Sundays, attend some place of Divine Worship. The neglect of our Worship of the Supreme Being is the forerunner of the Sinking of a good Moral Character. When the Attendance on the Duties required by the Christian Religion is neglected, there is then a gradual decline from one degree to another, until we are even brought to deny the Reality of that Religion & turn Deists. The Christian Religion holds forth Rewards & Punishments—eternal Happiness or Misery—on the purest Principles for the good ordering of Society while here, & our eternal Welfare hereafter. Relinquish the system of revealed Religion, then, on what foundation can you build your hopes of Futurity? The Answer is plainly, On none—or on a State of uncertainty. Miserable state—to be lost in Doubt & Difficulties in a matter that should so greatly concern us. But perhaps some may say, ‘Reason is a sufficient guide.’ But six thousand years should convince us that, unaided by Divine Revelation, Reason has run into every extreme, every folly, every wickedness. Has not Reason prompted the world in different ages to worship men, beasts, stocks, stones, & even to sacrifice their children to appease a senseless Deity & quiet their Consciences? It may be said that this was not consistent with Reason—it was madness, folly & stupidity. But why do we say so? Because Divine Revelation hath enlightened us: and even Infidels & unbelievers are benefited by the rational Truths contained in the Holy Scriptures.”

“Washington, Feb. 26th, 1802.

“ . . . From what I am now going to write, you will doubtless think that I make Absorbents a grand Catholicon in Medicine. If you did, it would be nearly true. Since I have been here, I have directed their use in a variety of cases, & they have never disappointed my expectations. The Patients have been relieved, & if they laboured under a Fever, the fever, after the use of Absorbents, was of short duration; & the Effect produced is founded on the most rational Principles.”

Here are extracts from two letters written in Cecil County, in September, 1799, in which, although Æsculapius occasionally flits before us, he is soon fain to hide his diminished head amid the distracting hubbub of war and politics. Could they

now be read by the Presbytery which pronounced him "utterly incapable of expressing his ideas upon any subject," it is not impossible that that venerable body, while they might not see in the letters anything to cause them to regret his absence from the ministry, might be disposed to assign some other reason for excluding him therefrom.

" . . . The news tells us Republicanism is expiring. This comes from the hotbed of Royalty. I am sure, if I admit one-fourth of what they relate, I should have a Right to claim by Act of Supererogation. I believe it is right the French should be drubbed. I do not mean finally, but as a chastisement for their many errors & cruelties. [This refers, of course, to the excesses of the French Revolution.] They have been as despotic as the Tyrants they have opposed, & royal Gold has showered down on numbers of them, that they might betray, or at least do acts unworthy of true Republicans. I believe that the King of France was the tenth Horn of the Beast—if so, it was the first that was to be destroyed. Others are also to be destroyed. . . . Then will the Beast & Kings & Emperors fall together into the Bottomless Pit that is, a State of Neglect—degraded, despised, & at last forgotten."

It is rather amusing that one who, on all occasions, was utterly fearless in expressing his political opinions, should close his letter in this abruptly subdued tone: "Although you may speak of Politics with your Friends, I think you should be cautious that you offend none—no, not a little one."

In the other letter, of date a week later, he writes:

" . . . When I wrote you last, I stated, that from the Head of Tide upwards, the bilious Fever was general, but that it did not extend far from the River. I can now say it has gone up the Creeks & even the Branches that empty therein. It is like the murderous Suwarrow, who goes where he is not wanted & destroys without mercy; but it is unlike him in this particular—it spares neither Aristocrat nor Democrat, neither Republican nor Monarchist. The Friend to America & the Friend to Britain are all involved in the common fate of the Country.

"What do the dear, dear Friends of Britain think of the Condemnations at New Providence and Jamaica? I trust it will become an Emetic—that they may emit their Monarchy & their Aristocratic Principles. . . . Will America tamely say that the French are the only Pirates, Murderers, Plunderers, Floggers in the World, when, in Nassau, there has been condemned of American Property in the Month of August to the amount of 293,000 Dollars? Will not this open the Eyes of Americans? Why was it done? Because the President has dared to appoint Envoys to treat with France?

"In haste, I am," &c.

A sketch of him, which I have not seen, is to be found in Lanman's "Biographical Dictionary of the American Congress." In 1826 Dr. Revere, contemplating the publication of his "Biography of Eminent Physicians of America," wrote to one of Dr. Archer's sons for facts in his career. The following is an extract from a fragmentary sketch prepared in compliance with the above request, but never sent, being afterward found among the son's papers:

"Dr. John Archer proved himself an able physician during an arduous practice of about half a century. He was successful in many of the important operations in surgery; and as an accoucheur, for judgment and dexterity, was not surpassed by any who had gone before him in the medical world." . . .

In "Hooper's Dictionary, edited by Samuel Ackerly, M. D.," may be seen the following:

"Archer, John, M. D., of the State of Maryland: a celebrated practitioner of medicine. Many contributions of his on various subjects of medical science are to be found in the New York *Medical Repository*. He was the first to introduce seneka snake-root (*polygala senega*) as a remedy in croup. He died in 1814."

The date of his death here recorded is, however, incorrect. It should be 1810. His degree, as given above, is also erroneous; it should be M. B. He was "Doctor" only by courtesy, having never applied for the second degree. The institution in the first year of its existence adopted a rule that two degrees, M. B. and M. D., should be conferred with three years intervening. In 1792 this rule was discontinued and only the degree of M. D. was conferred. The official catalogue states that very few applied for the Doctor's degree during the early years of the college.

His love-letters, written while pursuing his medical studies in Philadelphia, though silly enough in their exuberant endearments, are not a whit more so than those of the average man on such inevitable occasions. Fortunately, he attempts *poetry*—the *sine qua non* of the infatuated lover—but once; and the quality thereof shows unmistakably that he knew infinitely more of Medicine than of the Muses.

In October, 1766, while pursuing his studies, he came on to his native county and married the lady upon whom these

endearing terms had been lavished. She was a daughter of Thomas Harris, of Pennsylvania, who had removed to Maryland. He was a member of the family that founded Harrisburg. Among his descendants of the present generation is the illustrious astronomer, Professor Simon Newcomb. Thomas Harris, in his old days, returned to Pennsylvania and died amongst his kin in Tuscarora Valley, in 1801, over one hundred years of age—*having lived in three centuries.*

Dr. Archer in his will (dated September 23, 1808, signed and sealed twenty-ninth of December, 1809, and proved twelfth of January, 1811), devised all his estate, real and personal, to his wife Catherine, as trustee for their children (five sons) during her life or widowhood; on her death or marriage, to be divided equally among them. His real estate consisted of about seven hundred acres of land in one body. He directs, that as there are many persons indebted to him as a physician—many of whom cannot pay without distressing them—"my sons, who are my executors, are directed to make the following entry in cases of such as they think are unable to pay: 'Forgiven by order of the Testator.'" Accounts to the amount of several thousand dollars are so credited in such of his ledgers as are still extant. His male slaves are to be free at thirty years of age, and the females at twenty-five.

Numerous anecdotes have been handed down, which will serve to illustrate some of the more salient points of his character.

A neighbor, who was widely known to be more ambitious of fine display than of satisfying the just demands of his creditors, undertook once (and only once), to rally the doctor on the mean appearance of his badly-groomed and awkwardly-gaited Rosinante,—and, to say truth, he was not over-nice in his selections of horseflesh. "Every hair on this horse is paid for," was the gruff, though well-merited, rebuke.

At a mixed political gathering, he got into a dispute with the sheriff of the county on some exciting party issue. The latter, finding himself worsted in argument, suddenly changed his tactics and came down upon the doctor with brute force, whereupon the assaulted party hurled the pugnacious dignitary to the ground, and was pounding him according to his

idea of justice—so that the singular spectacle was presented of one man breaking the peace, whose peculiar duty it was to preserve it, and another inflicting wounds, who had made the art of healing them his lifelong study. Mr. Sheriff, however, soon cried, "Enough!" "Do you pretend to know the dose better than the Doctor, you rascal?" was the uncompromising reply; and it was not until after an additional cuff or two that the restraints put upon the shrievalty were removed.

Soon after being placed upon the Committee of Observation, in 1775, he met in the public road, on horseback, an influential Tory of his acquaintance, who accosted him in a very excited and insolent manner, when the following colloquy took place:

Tory.—Well, sir, I understand you are part of what is called a Committee of Observation?

Doctor.—I am, sir.

Tory.—And pray, sir, what's the purpose of the d——d thing?

Doctor.—To keep an eye on such scoundrels as you; and, if necessary, thrash them.

The Tory, a powerful man, now leaped from his horse and advanced, as if eager for the fray; but finding the doctor was operating on a corresponding line with characteristic energy, he remounted without loss of time and rode off.

He was wont, when coming upon a party engaged in long-bullet rolling—then much in vogue—to dismount and take part—with the invariable result of beating them all.

Occasionally, when nearly worn out by professional duties, he would steal off to some hospitable home, where he was sure of a welcome, and remain until rested,—not even telling his wife of his hiding-place. A favorite resort of the kind was the home of Mr. Philip Thomas, on Mt. Ararat in Cecil County. This gentleman (at one time, I believe, a member of Congress), whose family he attended, was always glad to have him as his guest, and was wont, when the doctor signified his intention of leaving, to place in his way several interesting novels—knowing his weakness for that class of literature. The invariable result was that the guest tarried until he had devoured their contents. This he did eagerly, but in a rather peculiar way—always beginning at the end and reading the events backward.

In his Ledger "I" is:

"Philip Thomas, Esq.,	Dr.
1797. Nov. 21st. To inoculating twelve of your Negroes . . .	£9.
Nov. 27th. Ad inserend: Infect: variolæ in Filios (5) et Africanos (32).	
To staying with your Family (when inoculated) by your particular request, three weeks	£29.15"

The doctor's good wife, naturally enough, resented to some extent these prolonged periods of absence in unknown parts. On one occasion, when a stranger appeared at "Medical Hall," and inquired if Dr. Archer lived there, she sarcastically replied: "A man of that name gets his washing done here."

On returning, after one of those prolonged hidings, and entering the office, he found no one there; but on the study table was a pack of cards. Though card-playing was decidedly against the rules, he simply wrote on one of them, in his unmistakable chirography, "This is neither Van Swieten, Boerhaave, nor Cullen." No "devil pictures" were ever afterward seen, at least by him, in that office.

Beneath his manly character and strong intellect ran a vein of superstition, as the following family tradition will show:

About the year 1777 he dreamed, for several nights in succession, that the house in which he was then living—his ancestral home—was struck by lightning and burned to the ground. He forthwith built a house on a distant part of the farm, selecting a very low situation, doubtless to diminish the risk from lightning, and moved into it with his family. He never afterward would allow the older house to be occupied, although it was commodious and in good repair. The dream was never fulfilled; and it was but a few years ago that the last vestiges of the abandoned edifice disappeared by slow decay. The home to which he removed is still in possession of a branch of the family and retains the name which he so appropriately gave it.

In person Dr. Archer was considerably above the medium height, possessing great bodily strength, and was endowed

with a large share of both moral and physical courage. His mind was of the combative order; and, although a throat disease had sadly broken his voice—perverting it into a loud, gruff whisper at its best, for the remainder of his days, and totally unfitting him for public speaking—he did not allow the affliction to exclude him entirely from the humbler field of personal controversy. With a vigorous intellect and a good education, he entered zealously the political arena, then in a state of excitement far surpassing that of our own day. Though unflinchingly earnest in the support of his party, he was too independent to degenerate at any time into the demagogue or place-seeker—too honest to be led by public opinion or to allow ambition to swerve him from his convictions of right—one of those bold, self-reliant natures, who, notwithstanding they possess infinitely more of the *fortiter in re* than of the *suaviter in modo*, exercise over their fellow men great influence, being admired for their strength of character and honored for their incorruptible integrity.

Had he applied himself exclusively to his profession, and especially had he been a more frequent wielder of the pen, he would doubtless have left his impress on the medical literature of the country. But, being particularly averse to the mechanical part of writing, and being not of those who “seek the bubble reputation even in the” (mortar’s) “mouth,” his fame as a physician must depend mainly upon a few desultory pages hastily thrown off amid the distracting hubbub of war and politics. While the effect of this will be to blend with the image of the skillful physician that of the stern old tyrant-hater, it must impart to his memory a dash of that interest which will ever, it is to be hoped, cling around the names of the prominent participants in our war for liberty.

Dr. Archer had ten children, four of whom died in infancy. Of the six survivors—all sons—five selected medicine as their profession and studied under their father. The youngest of these five, George Washington, died, while pursuing his studies. The other four, Thomas, Robert Harris, John and James—named in the order of age—completed their studies at the University of Pennsylvania and practiced their profession. James removed to Mississippi, where he married and

died while still a young man, leaving no child that reached maturity. The remaining son—the youngest of all—Stevenson, studied law and became Chief Justice of Maryland, member of Congress, and, by President Madison's appointment, in 1817, Judge of Mississippi Territory, with gubernatorial powers.

Four of Dr. Archer's sons left numerous descendants, among whom the ancestral proclivity for a roving life seems not yet to have died out. Although many of them still reside in Maryland, a greater number have gone forth to other parts. Some of them live in Virginia and Pennsylvania; several in Texas; and they are becoming quite numerous in Mississippi and Tennessee, with a few in Louisiana and even in the remote State of Washington. General James J. Archer, who commanded a brigade under "Stonewall" Jackson, in the war between the States, and died in Richmond in 1864, was a grandson of the subject of this sketch; Stevenson Archer, another grandson, was elected to Congress for several terms from the same district which was formerly represented by his father, Judge Archer, and his grandfather; and many others of the third and fourth degree of kinship served with distinction in the Southern army.

Dr. Archer sat for his portrait in Baltimore about 1802—the artist being a Mr. Harrison. It was painted for his son, Dr. Thomas Archer. Dr. Robert H. Archer engaged the artist for a replica, which was at once executed, and some time afterward a copy was made of this replica by another artist for Dr. John Archer, Jr. They are all, I believe, still in existence. The replica, is now about to be presented to the Medical and Chirurgical Faculty of Maryland. Its original owner always said it was much the best of the three portraits. And he mentioned to me as proof of its striking resemblance to the original, that many years, after his father's death, on seeing it in an unusual place and in a rather dim light, he thought for a moment, that it was his father himself—or, rather, his apparition. A copy of this replica also hangs in the court-room at Bel Air. It was recently taken by a Washington artist, and is very creditably done.

THE ACHIEVEMENTS OF ALEXANDRIA IN LITERATURE AND SCIENCE.**Alfred Gudeman.**

[Read before the Classical Club of Philadelphia, Friday, December 8, 1899.]

The death of Alexander, of Aristotle, and of Demosthenes, occurring, as it did, almost at the same time, constitutes in its synchronism one of the most memorable landmarks in the history of civilization. For while Alexander, with his sword, opened up new regions to the astonished gaze of mankind, and Aristotle, his great teacher, by the aid of his pen explored and conquered no less extensive fields in the domain of intellect; Demosthenes, with his eloquent tongue, was making the last but futile efforts to rekindle the all but extinguished embers of civic devotion and patriotic enthusiasm. With the departure of these heroes old Hellas went to its grave. " 'Twas Greece, but living Greece no more."

A nation's literature is an accurate mirror of its life, but never before or since have monumental productions of the human intellect been as indissolubly associated with the individuality of a people as was the case in ancient Hellas. It was, therefore, inevitable that the fountains of originality should run dry, with the loss of political independence and of that perfect liberty of thought which was the condition precedent for intellectual productivity.

The Greek language, too, underwent a great change, chiefly brought about by the Hellenization of Asia by the armies of the great conqueror. Constant intercourse with Orientals naturally tainted the purity of the Attic idiom, provincialisms and solecisms intruded in great number, the inflections became less rigid, and syntactical niceties of diction were no longer jealously preserved; all these influences conspiring to produce that singular linguistic phenomenon known as the *κοινή*, or common dialect.

Still another change was now ushered in, which would have been quite incomprehensible to a Plato or an Aristotle,—I mean the evolution of the scholar of leisure into the professional man of literature and science. To Plato and Aristotle a life devoted to philosophical contemplation and scientific research was indeed the highest attainable goal, but it had no

utilitarian aspect and was not to be pursued at the expense of civic obligations. This was, however, to be true no longer, for with the substitution of despotic monarchies in place of the free city republics, the scholars of this period sought seclusion in the library and the study; and, instead of appealing to an entire nation for an audience, were now content with a small but appreciative public.

All these momentous changes are outwardly signalized by the transference of political power to the capitals of Macedonia, Syria and, above all, Egypt; the focus of intellectual activity being at the same time shifted from Athens to newly-built Alexandria, which was destined to become the centre of ancient culture for centuries; and that, too, in a far truer sense than even Athens had ever been in the heyday of her prime, or Rome at a subsequent epoch.

In the distribution of Alexander's ephemeral empire among his generals the province of Egypt had fallen to Ptolemaeus, the son of Lagus. This monarch, unquestionably one of the greatest figures in history, had risen by dint of an indomitable perseverance and extraordinary talents from very lowly conditions to the highest posts of responsibility in Alexander's army. Egypt was, at the time when Ptolemaeus usurped its throne, rent by bloody feuds and in a state of political and social disintegration. But he no sooner found himself at the helm of state "when the ship steadied with an upright keel, and he began to evince a statesmanship as marvelous as had been his military genius." Being keenly alive to the true cause of the superiority of the Greek over the barbarian, he did not content himself with the establishment of shrewd religious and far-sighted political reforms, but endeavored to surround himself with an aristocracy of intellect as well. With this end in view, Ptolemaeus extended most cordial invitations to eminent men of letters and science to take up their permanent residence in beautiful Alexandria. For, if we can rely upon the enthusiastic comments of ancient writers, Alexandria must have been a surpassingly attractive city, and its climatic conditions seem also to have been singularly inviting.

Among the many who accepted the royal invitation were *Zenodotus*, the first scientific editor of Homer; *Straton*, the

noted philosopher; *Philetas*, the celebrated elegiac poet and the author of the first dictionary; *Euclid*, the mathematician, and *Herophilus*, the physician—all men who have written their names in capital letters upon the pages of intellectual achievement.

Finally *Demetrius Phalereus*, a fugitive from Athens, found a safe refuge and a warm welcome at the court of Ptolemaeus. It was this same Demetrius, a pupil of Theophrastus, "the last of Athenian orators, poet, historian, statesman, warrior, withal the most variously accomplished man of his time," who, according to an unimpeachable tradition, suggested to the king the idea of founding the great *Library* and *Museum*, which under the solicitous care and munificent liberality of enlightened successors continued to grow in size, in usefulness, and in fame.

In fact, these two institutions are so inextricably associated with the achievements of Alexandria in literature and science that an account of them will not seem out of place, particularly as a comprehensive discussion of the subject is not accessible elsewhere.

The original library was housed in a building, known as the Brucheion, which, as its name implies, was at one time designed for the less idealistic purpose of a grain storehouse. It was not long, however, before this structure became entirely inadequate for the vast influx of papyri, so that additional quarters were imperatively called for. These Ptolemaeus Philadelphus, the son and successor of the founder of the dynasty, provided by fitting up the beautiful temple of Serapis, as a kind of library annex.

The library itself was in charge of a chief librarian. The names of seven who held this high office within a period of 150 years are known to us, and they comprise the greatest scholars of the entire Alexandrian period. They are Zenodotus, Callimachus, Eratosthenes, Apollonius Rhodius, Aristophanes of Byzantium, Aristarchus and Ammonius.

Regarding the total number of MSS. stored up at Alexandria, the most conflicting and exaggerated accounts have come down to us. Thus the Byzantine chronologists, Eusebius, Syncellus and Cedrenus, speak of 100,000; Pseudo Aristetas, Josephus and Zonaras go as high as 200,000; Seneca, Plutarch

and Orosius give it as 400,000; while Gellius and Ammianus Marcellinus cap the climax with the magnificent total of 700,000 volumes. In this perplexity a discovery, some seventy years ago, happily came to our aid, which was to throw an unexpected flood of light upon this subject. In 1828, a German scholar, Fr. Osann, found a short marginal note in a Vatican MS. of Plautus, between the closing lines of the *Poenulus* and the beginning of the *Mostellaria*, and hence known as the *Scholion Plautinum*. Its contents are briefly as follows:

From Caecio's commentary on the *Plutus* of Aristophanes. Alexander Aetolus, Lycophron of Chalcis, and Zenodotus of Ephesus, at the suggestion of King Ptolemaeus Philadelphus, who patronized men of learning in a wonderful manner, collected all the works of the poets and arranged them in proper order: Alexander Aetolus took the tragedies; Lycophron, the comedies; and Zenodotus, Homer and the remaining poets. For this king established two libraries, the one outside of the palace, the other within. In the outer one, there were 42,800 volumina *commixta*, in the inner one, 400,000 volumina *commixta* and 90,000 *simplicia et digesta*, as Callimachus, the librarian, attests. He was shortly after succeeded by Eratosthenes.*

We were informed at the outset, that this information was taken directly from one Caccius. W. Dindorf at once conjectured that this wholly unknown individual was none other than the celebrated Byzantine philologist, Johannes Tzetzes, and Fr. Ritschl expressed the sanguine hope, that the Greek original might some day come to light from one of the numerous MSS. of Aristophanes' *Plutus*, scattered over the libraries of Europe. This prediction was destined to be partially verified sooner than the prophet expected, for only two years later, in 1830, Cramer published some excerpts in his *Anecdota Graeca* from a Paris MS. which, among other matter, contained a passage all but identical with the *Scholion Plautinum*. Finally, in 1847, Angelo Mai, the famous discoverer of the palimpsests of Plautus and Cicero's "*de Republica*," incidentally

* There follows the famous legend of the collection of the Homeric poems by Peisistratos and his philological commission.

announced, that there existed in the Ambrosian Library at Milan, "Joh. Tzetzes' ingens commentarium in Aristophanes' comoedias" and in this work was found the very account, albeit somewhat more prolix, of which the Scholion Plautinum was a translation.

We are now prepared to look a little more closely at the information thus fortuitously preserved, on the authority of none other than the great librarian, Callimachus himself.

In the first place then we learn that the Brucheion in the middle of the third century, B. C., contained 400,000 volumina, styled *commixta* (σύνμυκτα) and 90,000 *simplicia et digesta* (ἀπλῆ καὶ ᾄμυκτα) and that the library annex, the Serapeum, possessed 42,800 volumina *commixta*. Attention was, of course, soon turned to the explanation of these mysterious adjectives, and they gave rise to a very acrimonious controversy. The smoke of battle has now cleared away and scholars are all but agreed to accept the simple solution, suggested by Birt, in his well-known work, "Das antike Buchwesen." In the ante-Alexandrian days of book-making, it was customary to crowd as much matter as possible of one author or of several into a single roll of papyrus, a practice analogous to the folio system of more modern times. This cumbersome method, it would seem, was abolished by Callimachus, who introduced the *simplicia* volumina or small roll system, *i. e.*, a single book or a work of small bulk for each roll of papyrus, in place of the large-roll system or *commixta* volumina formerly in vogue. By the time of Antony, this system had been universally adopted, a supposition which at once explains why the library of Pergamum which, according to Plutarch, was presented by Antony to Cleopatra, contained only βιβλίοι ἀπλᾶι.*

Now this huge multitude of papyri, which the bibliomania of the Ptolemies had succeeded in accumulating, was, of course, quite useless for any purposes of scientific study and research so long as it remained in so chaotic a condition. Evidently the prerequisite thing to do was to catalogue them; and this is the second important fact which we owe to Tzetzes' note.

* Birt is also disposed to apply to this innovation, the famous saying of Callimachus, "A big book is a big nuisance," instead of interpreting it as a sneering allusion to the long-winded epic of his enemy, Apollonius Rhodius.

For not only do we learn that this crying need was recognized, but we also have given the names of the three famous scholars to whom this herculean task was assigned. It was upon these pioneer labors, doubtless, that Callimachus subsequently based his colossal catalogue of the entire library, the *πύλας τῶν ἐν πόλει παρθένων ἀαλαμυρόδυντων καὶ ὧν συνέγραψεν* (catalogues of illustrious men in every field of learning and of the works which they wrote), 120 books in all.

The library itself may be supposed to have remained intact until the siege of Alexandria by Julius Caesar in 47 B. C., when the Brucheion accidentally took fire. We do not know the extent of the damage, for the statement of Plutarch that 400,000 volumes were destroyed, or that of Gellius, who says that 700,000 were consumed, is clearly exaggerated. But whatever the loss sustained may have been, it is said to have been amply repaired by the aforementioned gift of Antony, who presented to Cleopatra the library of Pergamum, probably the second largest in the ancient world, containing, according to Plutarch, 200,000 *βιβλία ἀπλὰ*.

It was not until the reign of Commodus (180-192), and more particularly during the bloody riots in Alexandria, instigated by the fanatical bishop Theophilus, that the precious treasures of the library began to be scattered, and when Orosius in the fifth century visited the once famous city, he found only empty shelves.

Now in a work, entitled "Dynasties," written by a learned Arabian historian of the thirteenth century, named Abulpharagius, quite a different version touching the destruction of the glorious library is related; and down to the present day, not excluding some of our most recent cyclopedias, his account has been accepted without misgivings. The story was first introduced to modern readers by Gibbon, in the fifty-first chapter of his immortal work, and runs briefly as follows:

When the Arabian general Amr (Amru) was on the point of capturing Alexandria, in 641 A. D., one Johannes Philoponus, well known to us as an able commentator of Aristotle, is said to have importuned the victor to spare at least the ancient library and to present it to him as a gift. Amru was strongly inclined to accede to so reasonable and modest a request, but

his sense of duty would not permit him to do so without the special acquiescence of his superior, the caliph Omar. Accordingly a messenger was dispatched to him, who in due time returned with this famous answer: "If the writings of the Greeks agree with the Korán they are useless and need not be preserved; if they do not agree, they are pernicious and ought to be destroyed." The decree of the ignorant fanatic was at once put into execution, the second alternative being apparently accepted without investigation as the only plausible presumption. The books were carefully distributed among the 4,000 baths of the city, and such was their vast number, the veracious historian takes care to assure us, that more than six months were required for their complete destruction.

Gibbon himself has pointed out some of the suspicious features of this narrative. Memorable as such an event would have been, contemporary chroniclers pass it by in eloquent silence; and there is no trace of any such act of barbarism recorded in the six centuries that separate Abulpharagius from the time when the occurrence is alleged to have taken place. The caliph's alleged reply, moreover, is also quite incompatible with the tolerant attitude of Mahometan conquerors toward works of literature and science.

Gibbon might have added that the narrative itself bears weighty internal evidence of its spuriousness. In the first place, it is absurd to suppose that Amru, after overcoming a stubborn resistance, would have delayed the destruction long enough for the caliph's answer to be returned to him, simply because of the sentimental request of a Greek grammarian who lived fully a *century before* the date in question! Again, why should Amru have gone to the trouble of carefully distributing this huge mass of papyri among the 4,000 baths of the city? Would it not have been more expeditious to have applied the flames on the spot? The authenticity of the story of Abulpharagius must, therefore, be rejected. The library had doubtless been depleted of its contents some two hundred years previous, so that Amru, when he razed the noble city to the ground, would not have found books enough wherewith to start a conflagration.

So much for the *Library*. I now pass on to a consid-

eration of the *Museum*, its history, its organization, purpose and achievements. If our knowledge of the library was comparatively explicit and trustworthy, thanks to a recent discovery, we are in a far less satisfactory position in regard to its sister institution; for no authentic or fairly detailed account of its nature has come down to us, and hence numerous interesting problems, to which this organization gives rise still await solution.

Owing to this unfortunate circumstance, scholars have often come to look upon this subject as a splendid field for conjectural fancies, regarding the Museum as nothing more nor less than a grand University and Academy of Sciences, all in one. The productions of the Alexandrian poets, scientists and philologists were so many emanations of the Museum, and studious and talented youths from all parts of the civilized world crowded its lecture rooms. It mapped out the direction which their intellectual efforts were to take: it was the guiding star that conducted the young author upon the thorny path of fame.

It is almost painful to destroy so charming and fascinating a picture, but the fragmentary state of our knowledge on this subject does not warrant such sweeping generalizations. What we actually do know about the Alexandrian Museum may be briefly told.

Before doing so, however, a word or two concerning the name itself will not be out of place in view of the restricted meaning which attaches to the word "museum" now.

It was a beautiful and time-honored custom among the Greeks to consecrate places devoted to intellectual pursuits to the benign protection of the Muses. On Mt. Helicon, their supposed abode, a temple had been built and choral dances were annually celebrated in their honor. The Pythagoreans are said to have called their place of meeting the Mouseion, and thus the name naturally came to designate alike the places beloved of the Muses, and those where instruction was imparted. In the days of Plato and Aristotle, the Mouseion seems to have been the locality where these great teachers, "far from the madding crowd's ignoble strife," and under the broad canopy of heaven, were wont to lecture on the tenets of

their philosophy. The place of meeting was usually near a building containing a library and gymnasium, situated in a garden and surrounded by beautiful arcades.

Originally these gatherings were of a quite informal character, but in the days of Theophrastus they had crystallized, so to speak, into regularly organized associations (*θιάσσις*), presided over by a head-master (*σχολάρχος*). The meals were all taken in common (*συνσίτια*) and the student's life was regulated by fixed rules of conduct. Now, when we are told that it was none other than Demetrius Phalereus, himself a pupil of Theophrastus, who organized the Alexandrian Museum, it is a legitimate presumption that it was virtually modeled upon the Athenian pattern. But, quite unlike its Attic prototype, the new institution was essentially the residence of scholars, who, freed from all material cares, devoted their lives to original investigations in all the realms of human knowledge.

It has, as already intimated, been confidently asserted that the members of the Museum also gave systematic instruction to young men, but this is nowhere recorded and was in all probability not the case in the early days of the institution, excepting possibly in the field of medicine: for we know that Alexandria was for centuries the great medical school of the ancient world, and long after the Museum had ceased to exist, Ammianus Marcellinus, in the fourth century, tells us that no one was in his day considered a fully equipped physician who had not studied in Alexandria.

The munificence of the Ptolemies had provided for large botanical and zoölogical gardens for purposes of scientific research, and the Museum, as we are expressly informed, also contained spacious dissecting rooms. It was in these halls that Herophilus, next to Hippocrates the greatest physician of antiquity, began his epoch-making discoveries in anatomy and physiology. We have it on trustworthy authority that Ptolemaeus Philadelphus handed over to Herophilus the corpses of executed criminals, and he is said even to have sanctioned the vivisection of condemned murderers. The unprecedented character of this procedure will perhaps be better appreciated, when it is observed that even Aristotle, himself the son of a

physician, had not yet advanced beyond the dissection of dead animals. Vivisection of human bodies, shocking and abhorrent as it would naturally be to us, appeared, however, far less revolting to the religious Greek than dissection of the dead; nor were the ancients generally influenced by that mawkish sentimentality which prompts so many kindhearted but deluded people in our own day to oppose even animal vivisection.

Among other scientists of the Museum casual mention has already been made of *Euclid*, the mathematician. No higher tribute to the permanent value of his labors can be paid than the mere statement that his geometry, with but few and insignificant modifications, is still in use in some of the schools and colleges in England and America, a model of accuracy, clearness and scientific demonstration.

Apollonius, of Perge, who lived in Alexandria about the year 200, wrote a famous work on conic sections, he being the first to introduce the words "ellipse" and "hyperbole" into the terminology of mathematics. His high reputation in antiquity is attested by the designation "the great geometrician."

Hipparchus, the most celebrated astronomer in antiquity, flourished about 150 B. C., and shed immortal renown upon Alexandria by his epoch-making discovery of the precession of the equinoxes. He was also the first to determine the inequality of the moon's orbit, and he is the author of the famous hypothesis of epicycles and eccentrics, a mathematical conception intended to explain the apparent motions of celestial bodies on the principle of circular movement: a theory accepted without question until overthrown by Kepler. He is the founder of trigonometry, and was the first to mark the geographical location of towns, etc., by means of longitude and latitude. Finally, his catalogue of the stars, 1,080 in all, was, considering his imperfect instruments, a colossal achievement.

Another great name, closely associated with Alexandria, where he lived and studied for a considerable time, and possibly also as a member of the Museum, is that of *Archimedes* (287-212). His discoveries, both in pure mathematics and in mechanics, are of the most brilliant description. In physical science he laid the foundation of hydrostatics, invented a method for the calculation of specific gravities, discovered the

true theory of the lever, and investigated the equilibrium of floating bodies. A certain kind of screw still bears his name, and his burning mirror, by which he is said to have set fire to Roman ships at the siege of Syracuse, is also well known.

Ktesibios, who flourished under the second Ptolemy, is the inventor of many ingenious mechanical contrivances, and *Heron* (about 150 B. C.), also of Alexandria, was an extremely versatile mathematician, and is especially noted for his geodetic researches.

Botany and zoölogy were also very considerably advanced beyond the point reached by Aristotle and Theophrastus. In a word, it may be said that in the domain of mathematics, both pure and applied, in physics, astronomy and mechanics, the work of the Alexandrian savants reached the high water mark of scientific progress in antiquity. Europe was, in fact, not destined to see their equals for more than seventeen hundred years.

But while the consummate achievements of the Alexandrian scientists challenge our admiration, the philologists and critics, most of whom were members of the Museum, have possibly a still higher claim to the lasting gratitude of posterity, for it is to them that we virtually owe the preservation of those monumental masterpieces of the Hellenic intellect which have filled the world with beauty and inspired genius ever since.

The death of Alexander, of Aristotle and of Demosthenes, as was observed in the beginning, as effectively marked the close of the political life of old Hellas as it did that of the productive period of Greek literature. The Alexandrians keenly felt that if this glorious literature was to continue its powerful sway, it had to be handed down in a form capable of being understood. They, therefore, set to work to take an inventory, as we have seen, of this priceless inheritance. Their task was a twofold one. They cleansed the texts of the corruptions which in the lapse of time had defaced the originals and they applied an unflagging industry, a penetrating acumen and a profound erudition to the elucidation of Greek poetry; and thus by explaining obscure allusions, analyzing the style and language, accumulating all still available historical and biographical information, they made it possible for contemporaries, and still

more for later generations, to enjoy and appreciate these masterpieces themselves. The Alexandrians thus became the founders of philology as a science; for the differentiation between philology and literature which some modern critics, profoundly ignorant as they usually are of the methods and aims of the former, are so fond of making, would not even have been intelligible to these Alexandrian scholars.

It is, of course, quite impossible to do anything like adequate justice to their disinterested labors in the cause of literature within the narrow limits to which I am here confined. I must, therefore, content myself with a very rapid and superficial survey of the most celebrated critics, commentators and poets of this period.

The pioneer was *Zenodotus*. Born in Ephesus about 310 B. C., he came to Alexandria in 294, probably in the company of his teacher Philetas, the illustrious elegiac poet and compiler of the first dictionary. He was the tutor of Ptolemaeus Philadelphus, became the first librarian, and was commissioned, as we have seen, to classify and catalogue the MSS. of the poets of Greece, exclusive of the dramatists. But his abiding reputation rests upon his edition of Homer. He was the first to restrict the name to the *Iliad* and *Odyssey* and the division of these epics into twenty-four books was also introduced by him and has been retained ever since.

His successor as librarian was *Callimachus*, perhaps the most typical and representative figure of the Alexandrian school of letters. He was born in Cyrene, in Africa, and taught school for a time in Eleusis, a suburb of Alexandria. We have already made his acquaintance as the author of the great catalogue, which constituted an inexhaustible fountain of information concerning Greek literature for centuries: for he did not rest satisfied with a bald enumeration of titles, but added biographical, bibliographical, literary and critical comments wherever called for. As an author he also won undying fame, for the unanimous verdict of antiquity places him in the very first rank of the elegiac and epigrammatic poets of Greece. His influence upon the Roman poets, in particular upon Catullus, Propertius and Ovid, was profound and more extensive in details than we are now able to trace, owing to the loss

of the greatest of Callimachus' works. For but a few of his epigrams, a large fragment of a small epic and five so-called hymns, have been rescued from the disastrous tidal wave which has swept away the poetical productions of Alexandria, the works of three contemporaries excepted. The one is the *Alexandra*, an enigmatical poem of *Lycophron*, the Robert Browning of antiquity; the *Argonautica* of *Apollonius Rhodius*, to which Vergil is under such deep obligations; and last but not least, the idyls of *Theocritus*, without question one of the greatest poets of all times or countries.

Alexandria was to produce but one other, in whom the savant and the poet were combined. It is the third librarian, *Eratosthenes* of Cyrene. His encyclopedic erudition gained for him the nicknames of *Πένταθλος*, the all-around athlete, in the intellectual arena and *Beta*; indicating that, while he did not reach the first place in any field of knowledge, he was not lower than second in any. *Eratosthenes'* claim to immortality now rests on the fact that he laid the foundation of geography and chronology as sciences, certainly no mean distinction. He is also the author of a standard work on Greek Comedy.

But without doubt the greatest philologist, not only of Alexandria, but of antiquity, is the sixth librarian, *Aristophanes* of Byzantium. To him, perhaps, more than to any one man, we are ultimately indebted for the preservation in readable and intelligible form of most of the poets of Greece: for his editions with commentaries of the dramatists, of Hesiod and Pindar, for example, were the solid foundation upon which later labors were based.

The long list of illustrious Alexandrian philologists closes with the sixth librarian, *Aristarchus* of Samos, a pupil of *Aristophanes*. Lacking the marvelous versatility, the fine æsthetic judgment, the phenomenal erudition, in a word the genius of his great predecessor, he seems to have surpassed him as a textual critic, so much so that his name became proverbial for the critic par excellence. In our extant sources *Aristarchus* overshadows *Aristophanes*, a fact probably due to the circumstance that he had the good fortune to have had enthusiastic pupils and followers who handed down the master's work and sang his praises in their writings.

With the death of Aristarchus in 146 B. C., coincident with the destruction of Carthage and Corinth, a rapid decline of Alexandrian scholarship begins, so far, at least, as the opening up of new fields of research is concerned. Its mission had been accomplished, and later students were content to feast at the richly laden banquet which the scholars of the Museum had, within the space of a century, prepared for them.

Regarding the inner organization of the Museum we possess but little authentic information. It was in charge of a priest of Serapis; the meals, as at Athens, were taken in common; and the institution, as Strabo expressly tells us, was provided with funds of its own.

That the members were all supported out of the royal treasury is nowhere stated in so many words; it must, however, be inferred from an amusing anecdote, preserved by Athenaeus. A well-known scholar, Sosibios, surnamed the Wonderful Solver, because of his skill in unraveling knotty philological problems, had, on one occasion, proposed an atrocious emendation to the text of Homer, by transposing some words in a most arbitrary fashion. Not long after, he felt called upon to complain about his not having received his salary as a member of the Museum. The king, who had, of course, learned of the unwarranted liberties which Sosibios had taken with the text of the sacred bard, ordered the treasurer to fetch the pay-rolls of the Museum. Among the first names which met his eyes were those of Soter, Sosigenes, Bion and Apollonios. Then turning to the grammarian he said: "Why, look here, my good fellow, you have been paid according to these records, for if you take the first syllable of *Soter*, the second of *Sosigenes*, the first of *Bion*, and the last of *Apollonios*, you get the name *Sosibios*."

Athenaeus forgot to tell us whether Ptolemaeus carried his practical joke to its ultimate end, but the story can leave no possible doubt that the members of the Museum received regular salaries out of the king's exchequer. Without this presumption the anecdote could not well have been invented, or would, at least, have lacked all point; for paradoxical as it may seem, there is nothing more truly authentic than an apocryphal anecdote, if correctly interpreted.

Such a life of study, so free from pecuniary cares, with immediate access to the greatest library of the ancient world, naturally excited the envy of outsiders, a feeling still reflected in the following cutting epigram of Timon of Phlius: "Bookish cloisterings in number are fed in populous Egypt, and in the hencoop of the Muses they keep up their endless fights."

Under Roman rule, the Museum gradually lost its distinctive and exclusive character, and a brutal Roman gladiator had taken the position of the priest of the Museum, when Caracalla finally abolished its time-honored common meals and deprived it of all its ancient privileges, ostensibly on the ground that Aristotle was held in high esteem by the members of the Museum, for the insane despot cherished an ancient grudge against the Stagirite, believing him to have been responsible for the early death of Alexander the Great, his own illustrious predecessor! From this staggering blow the Museum never recovered, and from that time on we hear no more of it. Thus the Library and the Museum, as they had been founded together, also perished together.

Past number certainly have been the brilliant constellations that have since appeared upon the firmament of literature and science; but the glories of Alexandrian achievement have not been extinguished, and the broad galaxy of guiding stars which arose in that noble city, more than 2,000 years ago, still shines with imperishable lustre.

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"UNIVERSITY DAY,"

February 22, 1900.

PROGRAMME.

SELECTIONS. *The Municipal Band.*

ACADEMIC PROCESSION.

PRAYER *Rt. Rev. Ozi W. Whitaker.*

NATIONAL HYMN—"America"

CONFERRING OF HONORARY DEGREES IN UNIVERSITY COUNCIL.

INTRODUCTION *Provost Harrison.*

ADDRESS . . *His Excellency, the Chinese Minister to the United States.*

UNIVERSITY HYMN—"Hail! Pennsylvania."

BENEDICTION.

Chief Marshal.

JUDGE EDWIN A. JAGGARD '82 L.

Assistant Marshals.

Thomas Leaming, '76 C.	William Bowen Boulton, '79 C.
Ludovic C. Cleeman, '59 C.	William Heyward Drayton, Jr., '81 C.
Robert Patton Lisle, '62 C.	Lewis H. Taylor, '80 M.
Cornelius Stevenson, '63 C.	William E. Casselberry, '79 M.
Nicholas Henry Thouron, '64 C.	John L. Wentz, '82 M.
Sidney W. Keith, '76 C.	Howard Gerald Provost, '84 D.
Thomas Robins, '77 C.	Allen J. Smith, '86 M.
Lewis Neilson, '81 C.	Ernest Wende, '84 M.
Charles Edward Ingersoll, '82 C.	Cecil Clay, '59 C.
John Lambert, Jr., '83 C.	Robert Carmer Hill, '89 C.
Thomas Lynch Montgomery, '84 C.	Thomas Turnbull, Jr., '87 M.
Hugh Walker Ogden, '90 C.	

Aides—Class Presidents.

John Sebastian Conway, '00 C.	Samuel Crowther, Jr., '01 C.
Robert Holmes Page, '02 C.	William Gilfillan Gardiner, '03 C.
John Henry Outland, '00 M.	Josiah Calvin McCracken, '01 M.
Benjamin Franklin Roller, '02 M.	Charles Hay Spayd, '03 M.
Charles Louis McKeehan, '00 L.	Walter Coggeshall Janney, '01 L.
Joseph Robert Wilson, '02 L.	Clifton Ernest Lord, '00 D.
George Eugene Davis, '01 D.	William George Hanrahan, '02 D.
Hulbert Young, '00 V.	Charles Louis Colton, '01 V.

Samuel Burrows, '02 V.

INTRODUCTION BY PROVOST HARRISON.

The University of Pennsylvania has now conferred its highest honorary degree upon learned and distinguished representatives of many nations, differing in their customs, their manners, their arts and modes of life, in their jurisprudence and in their religions. Nations in infancy and in age; Saxon, Latin, Mongolian and our composite American; living under the civil and the common law; accepting the teachings of Confucius and Mencius and the Holy Scriptures of Christians.

The oldest has come to meet the youngest at the University gates—our open doors—with that sympathy of love of country and love of learning which may give expression to mutual respect, and to a prayer for peace to men, of good will, upon this University Day of ours—the birthday of Washington.

Upon the men of our own kin, upon those whom Oxford and Cambridge have sent across the sea—upon those ancient universities and all that they represent—we have placed the red and blue ribbon, our own symbol—in token of a fellowship which we believe must last as the three universities themselves shall last. If that imperial German unity which now exists is the fruit of a unity of German thought, created by her university scholars, we, here and in our mother country, may have greater motive to greater effort in our universities for like concord of educated men. To them and their sons and their influence are due all that make a nation free—the enfranchisement of the people, the promotion of elementary education, the reform of prisons, the abolition of slavery. To England, to Oxford and Cambridge, we return to-day our measure full of academic and loyal tribute. The millennium of her great King Alfred, at the royal city of Winchester, will not be forgotten by us of this University.

To the President of the Republic of Mexico, represented in the person of his Ambassador, the University has given its highest honorary degree for the public service he has rendered during many years to his own country, and, in consequence, to the family of nations. Under that firm hand, learning has been fostered, public and private enterprises encouraged, order maintained where disorder ruled; a nation growing daily in public respect; science and letters and industry pursuing their ways in paths of peace, because thought and opinion have been released from the fetters of many generations. Younger than we in such a national history, Mexico has a past whose records refuse to be interpreted, and an ancient architecture, the wonder and despair of the present.

And what shall I say of our own countrymen? We have sought to honor them for the things which they have done. The scales of justice have been held with no unsteady hand; luminous and lustrous has been the administration of the law, and patient and calm the confidence of the people in its wisdom. "Justice is the great interest of man on earth. It is the ligament which holds civilized beings and civilized nations together. Wherever her temple stands, and so long as it is duly honored, there is a foundation for social security, general happiness and the improvement and progress of our race." So Webster said.

To no less claim of merit has the teacher of its science and art his rightful due, than the judicial interpreter of the law. While we may claim the earliest effort and purpose, another university, the senior amidst us all in these United States, has the honor of being the first to establish a continuing School of Law. And that school has had two heads, so renowned for their success in purpose and administration that England comes to Harvard University for guidance in the teaching of the law. That school has been the Mecca of students of the law, the

fruitful mother of bench and bar, imposing new standards upon those for which there were now nor time nor place. The elder Dean had been already remembered well by his own University after his years of service. The younger Dean we have welcomed here to-day, in recognition of his undying work—and we trust to welcome him in the future, as the two schools shall draw like two magnets, with increasing force of merit.

In proper recognition of the influence so well known and so well received at the Ottoman Court, we have been glad to-day to welcome, quick upon his return to his native shores, the Minister of the United States at Constantinople. So clear in his office has he been, and so acceptable in his ways, that other nations have not hesitated to ask for the influence his intellect and personality had won. And we, too, but return in tardy fashion a debt of recognition, for we have never failed a friend at all times during the years of this University's great work between the Tigris and the Euphrates.

Your Excellency, we welcome you not only as the orator of the day, but as illustrative of the highest development of Oriental civilization, come in peaceful relations, through many years, with the influence of the best culture which Europe and America may offer.

What an apt occasion for comparison and reflection! We call our city venerable, and our University venerable, at whose bidding so many have come to-day. It was yesterday that we dedicated a noble university building to a noble science. It is but as of yesterday that Washington here received his honorary degree, and here dedicated in its simpler home the teaching of the law by James Wilson. A score of years back of the birthday of the senior living trustee of this University spans that whole bridge of time. But a few years more remote and the place where this great city stands was a town site. No one lived north or west of the "Old Building" at Fourth and Arch streets,

whose convenience might be regarded, so that the clock to have been established in the frame tower was to have had but two dials—to south and east.

China has lived her 4,000 years, patient, pastoral, immobile; seeking, hitherto, no answer to the question, Who is my neighbor; wishing, indeed, until now, not to be asked that question. The United States, restless, inquisitive, impatient, progressive, achieving results in a century at which the observer marvels, but of which ourselves take not the time to think, seeks admission to the Celestial Kingdom, and

“Upon the very border stand
Of that fair promised land.”

We know that our rigorous laws, severely interpreted, give us slight cause for favor or friendship. But we have asked you to address us, at this University, with the hope of instruction as to ways in which these two nations may come into contact and not to conflict.

When the best brain of this country is governed by the enlightenment of the universities, reform, conservative and yet progressive, is inevitable. And a public sentiment may be created by the universities even more enlightened, because more courageous than their own.

For your learning, and for your public and national services, we have clothed you, then, with our highest academic honors and with symbolic colors—the red and the blue—under which our University strives to realize the highest purposes. We feel that, loyal to your native land, you will, henceforth, be a worthy son of Pennsylvania.

And so we greet you to-day with the prayer that the colors of our own country, the red and the blue and the white, may typify in the first two the policies of justice and enlightenment, and in the last

“The white flower of a blameless life,”

in all our national measures.

THE PROPER RELATIONS OF THE UNITED STATES TO THE ORIENT.

Address Delivered in the American Academy of Music, University Day, February 22, by Wu Ting-fang, Envoy Extraordinary and Minister Plenipotentiary from China to the United States Government.

Two years ago to-day the President of the United States delivered the oration before you, and last year one of the most prominent and learned scholars, the Hon. Seth Low, was your orator. To succeed these eminent men in this distinguished rôle is indeed a great honor; but when it is considered that this is the first time the privilege of addressing you on Washington's birthday has been accorded to a foreigner, you will understand how proud and grateful I feel on this occasion. I am inclined to take this high compliment not as a recognition of any individual merit I may possess, but as a striking example of the friendly feeling shown to the country which I have the honor to represent. To the spirit of expansion also, unless I am mistaken, which pervades the whole country, I attribute this departure from the usual custom; and as the United States has extended its territory to the Far East, it is but natural that a great and leading University like this should catch the contagion, and invite the representative of a neighboring country to undertake this pleasant and honorable task. The custom of observing Washington's birthday by this University as "University Day" is a praiseworthy one. For the last two thousand years, the birthday of Confucius, the great sage of China, has been every year observed in all the colleges of China; and as your nation is young and your people are patriotic, it is fitting that you should follow the example of an older nation by keeping green the memory of "The Father of His Country." It is particularly fitting for the University of Pennsylvania, in whose city Washington established the

Federal government and became the first president of the nation, to commemorate every year his birthday.

The observance of the anniversary serves to recall to the mind of the people the noble character of the hero, to hold up his life as an inspiration to the nation, and to infuse the whole country with the spirit of patriotism.

The name of George Washington is by no means unknown in China. To every student of modern history his life and achievements are familiar. To be able to combine thirteen small states into a harmonious union for the purpose of carrying on a long and costly war with a powerful country, to establish a stable government, and to found a new nation on a firm basis,—all this excites the admiration of my countrymen who have read the history of the United States. He was not only a great soldier, but a great statesman also, for he laid down the sound principles of government which might serve as guides for other nations as well as for this republic. It may seem at first sight, paradoxical to say that we Chinese hold Washington in higher estimation for what he did not do, than for what he actually did, for his country. History has given us innumerable examples of great warriors, eminent statesmen, devoted patriots whom we regard with wonder and respect. Such are Cæsar, Cromwell, Napoleon, and many others that may be named. But where can we find another instance of entire subordination of personal ambition to the public welfare? The love of power which is innate to every man seems in his case to have been controlled by a higher sense of public duty. We know that he carried the war of American independence to a successful issue, accepted the unanimous call of a grateful nation to be its chief magistrate, and after holding that high position just long enough to put the Ship of State in a proper and good condition, he voluntarily stepped down from the pinnacle of power without the least regret. He might have taken a different course. He might have

remained in power to the end of his days. The very fact that he was master of his ambition, and not its slave, stamps him as a truly great man. The only historical characters I can think of who resemble Washington in this respect are Yao and Shun. These two great monarchs reigned in China from B. C. 2357 to 2206, and during their respective reigns the people enjoyed perfect peace and prosperity. The virtues and benevolent sway of these two celebrated rulers have been held to this day in China as models for succeeding occupants of the throne, as immortalizing the following proverb: "Yao's benevolence was as universal as heaven, and Shun's virtue, as resplendent as the sun." It was the golden age of China; and after the lapse of four thousand years their memory is still held in great veneration by their grateful countrymen. The noble character of these two sovereigns, as was the case with Washington, was conspicuous by a zealous devotion to the welfare of their people, and by a sacrifice of their self-interest and ambition. Each left his throne, not to his sons, but to the worthiest; or in other words, the choice of the people. The principle of selection thus established was only revived by Washington, and has since been followed in this country.

Though it is not more than 125 years ago when Washington founded this young republic with thirteen states, she has since so enlarged her boundaries that the country is now composed of forty-five states and half-a-dozen territories. Through the logical course of recent events, she has acquired territory far beyond this continent, and become practically a neighbor of China. It gives me the greatest pleasure to say that the relations between the two countries are the most friendly and cordial; and I venture to express with confidence the hope that the fact of the United States' acquiring the Philippines will not only not disturb those amicable relations, but will have the effect of yet cementing them more friendly and closely. With such

intelligent people as those of the United States, whose policy as voiced the other day by the Postmaster-General in his speech in New York, is not territorial expansion, but only the expansion of trade and commerce, the relations of this country with China, and indeed with all the other nations in Asia, cannot be otherwise than cordial. This being the case, it is naturally expected that I should express my views as to how the best relations can be maintained. I do this willingly, feeling sure that what I shall say will be received in the same friendly spirit in which it is given. The first advice I would venture to offer is the importance of a clear understanding of the situation. Whether in diplomatic or commercial business, it is equally essential. It should always be borne in mind that the customs, manners, language, mode of education and way of thinking in Asia, are not similar to those in the West: consequently the Orientals think and act in ways entirely different from their brethren in the West under similar circumstances. To judge the action of an Asiatic by an American or European standard is a grievous mistake. I have seen costly litigations carried on for months in law courts between Chinese and Europeans simply through misunderstanding. I have seen bloody wars arise from the same cause. Each nation in those cases felt that it had been insulted, and considered the incident a *casus belli*. If the points of difference had been properly explained, and if what each nation imagined to be an insult could have been clear that no such thing was intended, the matters in dispute could have been amicably arranged, and no war would have ensued. But each nation was stubborn and tenacious in its own opinion, each judging the other from its own standpoint. One of the first requisites towards maintaining proper relations with the Orientals, therefore, is to understand their ideas, and to judge them not by your standard, but by theirs. This is as much applicable to commercial and social intercourse as to diplomatic and

international affairs. Let me give a common illustration. In China when a gentleman meets another for the first time, it is usual for both to ask each other's age, and other personal questions. It would be a mistake to regard such conduct as rude and insulting, as would be the case in this country. The asking of such questions shows the interest of the questioner in his new acquaintance, and is done with the best of intentions; therefore, it should be considered no more an insult than an inquiry after one's health. A perfectly innocent action can be easily misinterpreted to be a wrongful act. To do justice to an Oriental, you should not judge his action by what you would naturally think of it, but ascertain his motive for the act, and judge him by his own standard. This rule cannot be too often emphasized in your intercourse with the people in the Far East, as by its observance many disagreeable *contretemps* and misunderstandings may be avoided.

I must acknowledge that your diplomatic and consular officers in China have thus far acquitted themselves well, considering the disadvantageous position in which they are placed. Most of the European governments send young men to the East to learn the language and study the customs of the country. After a residence of two or three years, when they prove themselves proficient, after passing a strict examination, they are then placed in responsible positions as student interpreters, consular assistants, etc. Merit is rewarded by promotion. Thus those governments have competent men specially fitted for service in the Orient. It may not be unwise for your government to adopt a similar system. It gives me much pleasure to hear that this University, ever foremost in all educational movements, has announced a plan for a special school of commercial and diplomatic training, intended to qualify students for business employment or public service in the East. This is a step in the right direction. I trust that in the near future all Americans who go to the East,

especially to my country, whether in commercial pursuits, or in diplomatic or consular service, will have had training in that school, or any other school of a similar standing. While upon this topic, I may be permitted to make a suggestion on a kindred subject. I think that if a Chair of the Chinese Language and Literature should be established, it would prove very useful, not only in teaching the Chinese language to those students wishing to learn, but it might be the means of diffusing information on all matters relating to China. I have heard that both the Universities of Yale and Harvard had such a professorship in Chinese some years ago, but as there were very few students, the vacancy in each case was not filled after the death of the first holder. But the times have changed. In view of your rapidly increasing commerce and trade with China, and in view of your important political position there, the question is whether it is not worth your while to found a Chair of the Chinese Language and Literature in this University. I throw out the suggestion for the consideration of the Provost and officers of this great institution.

Constant intercourse between the East and the West of necessity requires a common medium of communication. The story of Babel has a moral to it. It was the confusion of tongues that scattered the people of the earth toward the four winds. Reverse the process, and you will bring the nations of the world together. In the days of the Cohungs, when the millions of the people of the Chinese Empire were brought into contact with the outer world only at a few points, and when buying and selling furnished the only opportunity for an interchange of ideas, it was found imperative that some means should be devised for making the wants of each side known to the other. Thus the jargon known as "pigeon English" (that is, business English) came into extensive use. This is "neither fish, flesh nor fowl," as far as extending among languages goes. But it has served a useful purpose, in that it has

enabled the Chinese and the foreigner to understand each other sufficiently to do such business as has brought them together for the last fifty years. The expansion of commerce at the present day, however, demands a better and more accurate vehicle of expression. Transactions involving thousands of dollars cannot be left to conjecture, but the rights and obligations of the parties must be defined in terms that convey a clear and well-understood meaning. In all the ports and important centres of the East the English language seems to hold a position in the school and in the counting-house such as no other language can claim. It is spoken in the streets of Shanghai as well as in those of Hong Kong. It is taught in the schools of Yokohama as well as those of Singapore. Chinese, Japanese, Germans, Russians and Frenchmen alike make use of it in their business offices, in their clubs, and in their family circles. In short, it may be called the commercial language of the Orient. Signs are not wanting that point to its ultimate adoption as an international language. It must not be understood that I am particularly partial to the English language. I only wish to see some language selected by common consent as an international language to be used when people of different tongues have dealings with each other. This would save a great deal of time and trouble. Life is short at best, and the time that is devoted to the study of modern languages nowadays might, with greater profit, be employed in the acquisition of some useful branches of knowledge. In order to fill the requirements of an international language, it seems to me that the English language, if adopted as such from its general use, might be first modified and improved in a great many ways. Foreigners, for instance, are unanimous in condemning the atrocious manner in which words are spelled in English. I need not point out to you how many words a single sound sometimes represents. This is a matter of your daily experience and must

come home to you oftentimes with great force. I venture to suggest that if you were to lop off all the excrescences from your words, such as the "ue" in "catalogue," and adopt the phonetic spelling altogether, you would spare many an unfortunate foreigner the trials and tribulations he has to face at every step. In these days of electricity and steam, men of business cannot find time to master all the intricacies of a foreign language. The case is different, of course, with scholars who devote their lives to study and meditation. In order to meet the demands of the times, a language must be so simplified that foreigners can, without too much expenditure of time and labor, acquire it for all practical purposes, before it can secure universal adoption. If, therefore, English is to maintain the ground it has gained in the Orient, it must be modified and improved on the lines I have indicated. As the American people generally take the lead in every movement of progress and reform, I hope this question of improving the English language will not be neglected. Indeed, I regard it as a hopeful sign that in writing the word "programme," the useless "me" are frequently left out, and the letter "f" is substituted for "ph" in "photography." A congress of university professors and school teachers should, I venture to suggest, be convened to take up this question, so that a simple and uniform system of spelling and communication may be adopted.

The opening of the magnificent building for the Law Department, which took place yesterday, is an important event in the history of this University; and I am glad that I was able to be present at the ceremonies. I take a peculiar interest in this department. Recognizing the value of a knowledge of common law and international law, I went to England to pursue my legal studies; and I had the satisfaction of being the first Chinese who became a member of the legal profession in the western world. When I see, therefore, the splendid edifice within whose

walls the students are to pore over their Blackstone, Kent, Wheaton, and other authorities, I am forcibly reminded of my student days in a similar institution in London. China has adopted the law of collision at sea which is in force in the western world. International law is much studied in China, and most of the standard works on that subject have been translated into Chinese. Wheaton and Woolsey are used as text-books, and are frequently cited as authorities in solving difficult questions. International law is founded on the principles of justice, and every nation should, as far as possible, conform to it; but if it should be more honored in the breach than the observance, then its study, I fear, would be soon neglected by students. I trust, however, that day will never come, at least in our generation.

The sudden possessions of new and vast territories in the East, with a population of ten million, composed of thirty different races, speaking as many languages, presents problems of a most serious character for solution, and naturally taxes to the utmost all the ingenuity which even statesmen of a high order possess. Hitherto your attention has been confined to this continent, and the government of so large an alien population in another part of the world is a new experiment. No wonder various schemes for their government are proposed; and the delay in coming to a decision indicates your cautiousness and unwillingness to commit a blunder. With the intelligence and common sense of the American people, I have no doubt a right conclusion will be arrived at. The policy of a wise statesman would be not to enact laws for the newly acquired possessions, without thoroughly studying the local requirements and peculiar circumstances, or to extend the laws of the mother country which might be unsuited to the conditions of the new territories. No unnecessary change in the existing laws and customs should be made. No encouragement whatever should be given to the ill feeling of

one race or class against another : no step should be taken to please or conciliate one class in the community at the expense or to the detriment of another class : no race or class legislation should be tolerated. The policy of the new ruling power should be strictly impartial, fair and just : no interference with long standing customs should be allowed unless they are cruel or injurious to good morals. Education is a great reformer, and if free schools are established, similar to the excellent public schools in this country, great results may be expected. This republic is young, and this is the first time she has acquired colonies 10,000 miles away. The experience is novel to her. Theories, however excellent, are not safe guides, especially in matters of legislation and government with respect to an alien race, and if errors should be committed, the consequences might be very serious. It is no disgrace to turn for some lessons to those powers which have had experience in the administration of colonies. England and France have acquired possessions in Asia, the former possessing territories which are not far from the Philippines, and having had to solve problems similar to those with which you are confronted. If a commission should be sent to those colonies to investigate the systems of government in actual operation, to study the experiments which have proved successful, and to find out what legislative enactments have been found suitable to the Asiatic people, this government would be able to learn some useful lessons and at least to avoid making mistakes which might afterwards be regretted and difficult to correct. The United States has now become an important factor in the Far East, not only on account of her newly acquired possessions there, but also on account of her steadily increasing commerce with the nations in Asia. It behooves her to adopt a line of policy commensurate with the importance of the situation. Last December I attended one of the numerous exercises in commemoration of the death of Washington. The orator strongly

advised the audience to read Washington's farewell address, remarking that he thought that not ten per cent of that audience had ever seen that document. I took the hint, and upon my return from that meeting availed myself of the first opportunity to peruse the address. It was indeed full of good advice. What struck me most was the foresight and transcendent wisdom exhibited in every line of that address. For a foreign policy what can be grander than these words: "Observe good faith and justice toward all nations. Cultivate peace and harmony with all." This should be written in letters of gold, and serve as a guide to every nation in the world. It corresponds in effect to what Confucius inculcated when he said: "Let your words be sincere and truthful and your policy honorable and just." This good counsel of Washington has been a potent factor in shaping the policy of this country, and warding off foreign encroachments. When it became universally known that the policy of this young republic, as foreshadowed by its founder, was that of keeping good faith and cultivating peace and harmony with all nations, a favorable impression was naturally created far and wide. All nations perceived that this country was pursuing a just policy, and did not dare to give the American people any cause of offence. And twenty-seven years afterwards, when President Monroe issued his caveat against foreign aggressions on the American continents, it was tacitly acquiesced in by all foreign powers. Why? Because it was founded on principles of justice and self-protection. It was not entirely a new doctrine, but a liberal interpretation of the sound principles laid down by Washington. So to secure the recognition of the "open door" in China by the great powers, which has recently been brought about by your government through the able Secretary of State, is not a departure from, but a continuation of, your traditional policy.

The question now arises whether it is not time for this

country to extend the Monroe Doctrine to Asia. The Philippine Islands are situated on the outskirts of Asia, and may be said to be at the very door of that continent. If it was necessary for President Monroe to declare any attempt to encroach upon any portion of the American continents, extending over six thousand miles from Alaska to Patagonia, as dangerous to your peace and safety, what shall you say to this when you find that the mainland of Asia is not more than six hundred miles distant from the Philippines? If it was thought proper not to allow Puerto Rico, or any of the islands on this side of the Atlantic, to pass into the possession of any foreign power, would it be advisable to look with indifference on any encroachments on the mainland of Asia, especially the eastern portion, which is nearer to Manila than Puerto Rico to Florida? I do not apprehend any encroachment will take place. But the Monroe Doctrine, being the fixed policy of your government, the natural logic is that it should be applied to that part of the world where this country has possessions. This policy is by no means a selfish one, but, as I have already remarked, is founded on justice and self-protection; and if persistently carried out it will tend greatly to the preservation of peace wherever it is enforced.

I am far from making light of the services of the army and navy of this country, whose bravery has recently excited the admiration of the world, and whose deeds have won undying fame. It must, however, be admitted that skill in warfare and bravery in action may conquer territory; but to govern newly acquired dominion peacefully, and win the hearts of a people belonging to a different race, calls for the administrative ability and sagacity of a statesman. The pen is mightier than the sword. The dictum of Mencius, one of our ancient sages, is still true when he says, "A king can conquer the world by brute force, but he cannot keep it without justice and righteousness." In this country there is no lack of able men who

can steer the Ship of State in a straight and undeviating course, keeping clear of shoals and rocks. Even in this hall I see around me men who have become famous in the different professions to which they belong; men high in office, who impartially administer the law and who scrupulously protect the interests of the people. The affairs of the nation are safe in such excellent hands. In this vast audience there are many undergraduates who are now enjoying the privilege of preparing themselves in this great seat of learning for the noble but arduous work which they will before long be called upon to perform for their country at home or abroad. Whatever positions they may be required to fill, no doubt they will discharge their duties faithfully, and with credit to themselves and with honor to their country. Happy is America, that can boast of so many sons who are growing up to take part in the affairs of the nation. In the hands of men who have received training in this noble institution, where grand truths and sound principles of government are taught, this young but great nation will certainly continue to prosper, and the Star-Spangled Banner will be not only the symbol of liberty and freedom, but also the emblem of justice and righteousness.

RECIPIENTS OF HONORARY DEGREES.

The degree of Doctor of Laws, *honoris causa*, was conferred in University Council upon each of the following: James Barr Ames, Dean of the Law Faculty of Harvard University; Gerard Brown Finch, representative of Cambridge University; Sir Charles Arthur Roe, representative of Oxford University; John Marshall Harlan, Senior Associate Justice of the Supreme Court of the United States; Oscar Solomon Straus, United States Minister to Turkey; Wu Ting-fang, Chinese Minister to the United States; Porfirio Diaz, President of Mexico (represented by Senor Manuel de Aspiroz, Mexican Ambassador to the United States).

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SOME HISTORICAL NOTES ON THE SEAL OF THE UNIVERSITY.

On the minutes of the meeting of the Corporation held June 6, 1899, there is recorded the fact "that a new University Seal was adopted," and the Secretary was instructed, upon the completion of the cutting thereof, to "break the existing die." At a subsequent meeting, held on January 2, 1900, the new die was presented and the old one broken in the presence of the trustees. The question that naturally arises in connection with this is: Why did the Corporation take this action, and what were the reasons that impelled a change in the existing seal? As a rule, every corporate body enjoys the right to "make and break" its seal at will; and usually action in such matters fails to excite even passing comment. But in the case here noted the history of a venerable symbol is involved, and the change in the seal becomes a matter of distinct historic interest, not only to every member of the University, but also to antiquarians in general. As an answer to the query propounded, therefore, the undersigned has attempted to collate all available material in connection with the history of the University seal; and further, to state briefly the reasons that led to the adoption of the most recent design.

The seal of the Corporation, in its original form, dates back to the earliest days of the old "Academy," which attained the rank and dignity of a "College" also, by virtue of the "confirmatory" charter granted in 1755. Two years later (1757) the first Public Commencement was held in May, and the diplomas issued at that time bear the impress of what is designated in these notes as the original seal.* The design itself was bald in the extreme, displaying a pyramid of seven books on a table-top, in perspective, labeled from bottom to top as follows: *Grammatica, Rhet-*

* See Figure 1. See also diploma of Francis Hopkinson, of date 1757, now in the possession of the Historical Society of Pennsylvania.

orica, Logica, Mathematica, Philos. Nat., Astronomia, Theologia. The books are surmounted in a semicircle by the words: *Sine Moribus Vanæ*; the whole being surrounded by the inscription: *Sigillum Academiae Philadel in Pennsylvania.*

From frequent references in the minutes of the Corporation during this early period, *two* seals appear to have been in use immediately subsequent to the date 1757, these being respectively, the Greater, or "Publick" seal, and the Lesser, or "Privy" seal. There is no description recorded, however, to indicate the difference between these two seals, nor are any impressions of them known to be in existence; but the inference is that the "Publick" seal was that which appeared on diplomas and other public documents, while the "Privy" seal may have differed from it in size only, being affixed to the private papers and records of the Corporation.

The original seal, as above described, continued in use by the "College and Academy" from 1757 to 1779, when all the legal rights and privileges conferred by the first charter of 1753, and the "confirmatory" charter of 1755, were transferred by Act of Assembly, for political reasons, to a new and different set of incorporators, under the changed style and title of "The Trustees of the University of the State of Pennsylvania." Ten years later (1789), however, the old board of trustees obtained from the Assembly a restoration of their rights; and thus, during the period from 1789 to 1791, the two institutions struggled on side by side, each endeavoring to attain individual success. But wiser counsels prevailed at last, and a union was effected by the incorporation, in 1791, of a body styled "The Trustees of the University of Pennsylvania." In this manner the old "College and Academy" and the "University of the State of Pennsylvania" simultaneously ceased to exist, the present style and title having remained unchanged to this day.



FIG. 1.

ORIGINAL SEAL.

[In use by the "College and Academy" from 1757 to some date *circa* 1786-1791.]

NOTE.—A seal similar to the above in all essential details, was in use from *circa* 1812 to *circa* 1830.



FIG. 2.

LESSER SEAL OF THE STATE.

[In use by the "University of the State of Pennsylvania," from 1786-1782. Reproduced from a sketch of an impress of the original die, in the possession of the Department of State, Harrisburg Pa.]



This brief digression into the complicated history of the University at the period mentioned is necessary in order to trace more intelligently the mutations of the seal. When the trustees of the "College and Academy" were ousted, in 1779, it might reasonably be inferred that the use of the original seal was also discontinued. But, as a matter of fact, nothing of the sort occurred, as is proven by the impressions on the diplomas of William Ewing and William Martin (now in the archives of the University), conferred by the "University of the State of Pennsylvania," and dated respectively 1781 and 1786. From this it would appear, therefore, that the use of the original seal was not actually discontinued until some time between 1786 and 1791.

In the meantime, however, the "Trustees of the University of the State of Pennsylvania" adopted as their own on April 5, 1780, the "lesser seal of the State."* This device seems to have been found unsatisfactory, because, on December 23, 1782, less than three years after the appearance of this "lesser seal of the State," the Corporation voted into use what is known as the "orrery" seal,† which bore upon its field a representation of the ingenious machine invented by David Rittenhouse in 1770. The reason for the selection of this particular device is not far

*Through the courteous co-operation of Mr Lewis E. Beitler, Deputy-Secretary of the Commonwealth of Pennsylvania, the writer is enabled to present, in Figure 2, a reproduction of the "lesser seal of the State," taken from the die now in the archives at Harrisburg. The use of this "lesser seal" (which dates back to 1780) on the part of the State continued as late as 1835, as is attested by a captain's commission (bearing the impress), issued by Governor George Wolf in that year (of date August 3), to one Christopher Seiler. This interesting document is now the property of Dr. William H. Egle, ex-Librarian of the Commonwealth, and kindly loaned by him to the writer for comparison. In this connection it may be of interest to quote from a letter of Dr. Egle to Mr. Beitler and transmitted by the latter to the writer:

"In reply to Mr. Merrick's request as to the 'lesser seal of the State,' if search is made in the Department of Internal Affairs a copy might be found. I have seen it (the lesser seal) attached to commissions of justices of the peace, when these officers were appointed by the Governor. I do not think it was ever used under the Constitution of 1838-39, when, under that form of government, the Governor was shorn of most all appointments, these becoming elective."

† See Figure 3. At the top of p. 139 will be found the description of this seal as it appears in the Minutes.

to seek. The orrery (which has been described at length in these columns), because of its novelty and clever mechanism, created intense public interest at the time; while the inventor became a trustee, and later vice-provost, of the University shortly after the orrery's construction. From the evidence at hand, therefore, in the form of existing diplomas and the minutes of the Corporation, the only logical inference is that the original seal *and* the "orrery" seal were used indiscriminately during the period between the years 1782 and 1791, according to the pleasure of their custodian.

After consolidation had taken place in 1791, the University of Pennsylvania adopted as its own the seal of the former "University of the State of Pennsylvania,"—the "orrery" seal—which continued in use until some time prior to the year 1812, when it disappeared. There is no record in the minutes concerning a change, nor is there any mention made therein concerning the adoption of a new seal to take its place. The M. D. diploma of Richard Wilson, dated 1796 (five years subsequent to the consolidation), bears the "orrery" seal; while the A. B. diploma of James J. Barclay, dated 1812, bears a seal which displays all the characteristic details of the original.

This "intermediary" seal appears to have been in continuous use until some time *circa* 1840 (the minutes again being silent on the point), when the "orrery" seal was reinstated as the seal of the Corporation. No further change was made until April 4, 1848, when the "orrery" seal was relegated to oblivion, and the seal* discarded in 1899 finally adopted. The latter was similar in its general details to the "intermediary" seal in use prior to 1840, and may therefore be considered as a lineal descendant of the original seal in use from 1757 to 1786-91. It is worthy of note that the pyramid of books is the dominant motive in each one of these three seals. Thus, with the formal

* See Figure 4.



FIG. 3.

ORRERY SEAL.

[In use (1) by the "University of the State of Pennsylvania" from 1782-1791; (2) by the "University of Pennsylvania" from 1791 to some date *circa* 1812; and again (3) from some date *circa* 1840 to 1848]



FIG. 4.

RECENT SEAL.

[In use from 1848 to 1869.]



adoption of the present seal, on June 6, 1899, its history is traced to date.

Now as to the reasons that led up to the recent change. The design of the 1848-99 seal was open to objection on several serious grounds. The feeling of those who were interested in correcting its errors was that the design was defective (1) heraldically; (2) from the point of view of accuracy in specification, and (3) artistically: defective because (a) the motto of the University was incorrectly displayed *directly on* the field of the achievement; (b) the "*Universitas Pennsylvaniensis*" did not express the full corporate title of the institution; (c) the words of the motto, "*Sine Moribus Vanæ*," meant nothing, owing to the enigmatical suppression of the subject "*Literæ*" (supposed to be understood from the pyramid of books); and because (d) the entire presentation was based upon a crude conception of what is proper and artistic in the treatment of seal design.

In preparing the design recently accepted, the constant thought was to preserve as much as practicable of the original seal, while correcting apparent errors and adding to the artistic effect. Thus it came about that the pyramid of books was retained as the characteristic feature, because of its great age and historic significance. On the other hand, the artistic treatment of the scroll bearing the motto, and the addition of the arms of William Penn—founder of the State whose name the University bears—both unite to lend to the entire conception a true æsthetic value. By a comparison of the present design with that of the seal just discarded, it will be noticed that the errors above referred to have been corrected, viz.: the full motto, *Literæ sine moribus vanæ*, has been placed on a scroll encircling the pyramid of books; while the full corporate title is expressed in the inscription in the outer circle: *Sigillum Universitatis Pennsylvaniensis Curatorum*.

As an appendix to the foregoing notes, there will be

found below a number of selected extracts from the minutes of the Corporation relative to the seal and its vicissitudes.

J. HARTLEY MERRICK,
Ass't. Sec'y. Univ. Penna.

Selected Extracts from the Minutes of the Corporation Relating to the Seal.

17 November, 1753 (Book I-p. 36).

"Mr. Allen, Mr. Peters, Mr. Francis and Mr. Franklin are . . . desired to get a Common Seal engraved for the Use of this Corporation."

13 April, 1756 (Book I-p. 68).

"That Mr. Smith prepare a public Seal for the Colledge with a proper Device and Motto and get the same speedily engraved on Silver."

8 March, 1757 (Book I-p. 79).

"To William Coleman, Esqr.

Dear Friend . . . When the whole is come to your Hands, please send the Coll. a Receipt, signed by you as Treasurer, under the Seal of the Academy, expressing, etc., etc.

I am Yours affectionately,

(Signed)

B. Franklin.

10 May, 1757 (Book I-p. 84).

"To the Provost, Vice-Provost and Professors of the College and Academy of Philadelphia.

Gentlemen: By this our written Mandate you are directed to admit Paul Jackson to the Degree of Master of Arts and Jacob Duché, Francis Hopkinson, Samuel Morgan, Hugh Williamson, James Latta and John Morgan to the Degree of Bachelor of Arts, they having been previously examined and approved in Terms of our Charter. Given under our Hands and sealed with the Privy Seal of the College this 10th of May, 1757."

(Signed by the members of the Corporation.)



FIG. 5.

PRESENT SEAL.

[Adopted June 6, 1890. Die formally presented to the Corporation, January 2, 1900.

The first diploma to which the above seal was affixed was that of His Excellency

Wu Ting-fang, Chinese Minister to the United States Government, of date

February 22, 1898.



15 December, 1761 (Book I-p. 137).

"And the President was ordered to affix the Great Seal to Dr. Smith's Power and to their address to the Proprietaries."

17 December, 1761 (Book I-pp. 157-8).

"The Trustees having observed that the Great Seal of the Corporation had never been affixed to Mr. Penn's Grant of 2,500 acres, his part of the Manor of Perkasio, they signed a Warrant to Mr. Peters, the President, under the lesser Seal of the Academy to affix the said Great Seal thereto, which was accordingly done and follows in these words:

The Trustees of the College, Academy and Charitable School of Philadelphia.

To Richard Peters, Esquire, President.

These are to authorize and require you to affix the Great Seal of the Corporation of the Trustees of the College, Academy and Charitable School of Philadelphia to the Counterpart of an Indenture of free grant by way of bargain and seal bearing Date the Twenty-first day of July in the thirty-third year of the Reign of his late Majesty King George the Second, etc., etc."

12 January, 1762 (Book I-p. 168).

"Mr. Peters delivered the greater and lesser Seals of the Corporation to the Trustees which they returned to him and desired he would keep them till further order."

11 January, 1763 (Book I-p. 190).

"And the President was ordered to affix the lesser Seal of the Academy to the Address to the Archbishop and Dr. Chandler, and to sign them as President on behalf of the Trustees."

12 April, 1763 (Book I-p. 201).

"A Petition was presented by Professor Williamson setting forth that he had in the absence of Dr. Smith received the Fees due for affixing the Great Seal to Diplomas and hoped that he might have the keeping of that Seal with the Perquisites attending it.

This petition lay for further consideration, and Mr. Peters was desired to examine and report what orders and Regulations had been made respecting the Great Seal and the Fees that were paid for it."

17 May, 1763 (Book I-p. 203).

"The Trustees, Professors, Candidates for Degrees and Scholars walked in procession to the public Hall, and as soon as seated a Mandate under the lesser seal authorizing the Faculty to hold a Commencement and confer Degrees."

14 February, 1764 (Book I-p. 243).

" . . . and not to assign without express leave in writing from the president of the Trustees under the lesser seal of the Acad my."

10 July, 1764 (Book I-p. 274).

"Agreed that the Treasurer pay to Mr. Charles Norris Three Pounds eighteen shillings for a screw for affixing the Seals of the College."

21 August, 1764 (Book I-p. 276).

"In testimony whereof, we have caused the lesser Seal of the said College, Academy, and Charitable School, to be hereunto affixed at Philadelphia, this seventh Day of July in the year of our Lord, one thousand, seven hundred and fifty-four."

(Signed on behalf of the Trustees by)
James Hamilton, President.

16 November, 1764 (Book I-p. 285).

"Ordered that Mr. Sargeant's two medals, in the custody of Mr. Hamilton the late President, together with the Seals, be delivered to the President elect."

19 November, 1765 (Book I-p. 300).

" . . . And Order or License under the lesser seal for permitting Lodowick Penner to assign his lease No. 6 to Matthew Kentz was agreed to be executed, and an advertisement to be published for letting the Lotts remaining on Mulberry & 4th Streets."

19 May, 1766 (Book I-p. 309).

"The Lesser Seal was delivered to the custody of the Governor as President, and the great Seal to the custody of the Provost, who being also Secretary, might always have the same

in readiness as the proper officer to affix it to Diplomas, Leases and other acts of the Corporation; the junior Professor, who had formerly sometimes had the custody of that seal, being often changeable, etc."

6 March, 1772 (Book II—p. 40).

"The Provost is desired to prepare a draft of a commission for Dr. Morgan, with a copy of instructions, . . . The Commission to be under the seal of the College and signed by the President of the Trustees, and also by the Provost as Secretary."

(Commission, p. 43.)

"Given at Philadelphia under our public [greater] seal this 20th March, 1772.

(Signed) James Hamilton, President of Trustees."

16 May, 1775 (Book II—p. 90).

"A mandate is ordered to be made under the lesser seal and to be signed as usual for conferring the Degree of Bachelor of Arts."

5 April, 1780 (Book III—p. 59).

"Agreed that the lesser seal of the State be the seal of this corporation until further order herein.

Resolved—That Mr. Bryan and Mr. Matlack be Attorneys in fact for the Corporation; and that they be instructed to endeavor immediately to obtain the possession of the house in which Dr. Smith now dwells, and to obtain from Dr. Smith the seals of this corporation."

19 March, 1782 (Book III—p. 113).

"The mandamus directed to the Provost, Vice-Provost and Faculty of the University, authorizing and requiring them to confer degrees in the manner heretofore ordered and directed, was now read at the Board, sealed with the seal of the corporation and signed by the Trustees severally."

23 December, 1782 (Book III—p. 141).

"The Hon'ble Mr. Hopkinson, a member of the Board, having laid before the Board an essay [design] of a seal for the

corporation of the University, the same was maturely considered and unanimously adopted.

The description is as follows; viz.:

The seal to be 2 inches in diameter; the Device a front view of the Orrery belonging to the University, invented and made by David Rittenhouse, esq. Above the Orrery a Star of the first magnitude in full radiance being one of the thirteen stars in the arms of the United States, representing the State of Pennsylvania. The inscription *Sigillum Universitatis Pennsylvaniensis*.

RESOLVED that Mr. Hopkinson be requested to have the above engraved, and to superintend the execution thereof; and that the Treasurer be directed to pay the expense attending the same.

RESOLVED, That the Treasurer be authorized and directed to sell the seal of the late college and Academy, now University, for so much money as the same is reasonably worth."

6 February, 1783 (Book III—p. 144).

"The Hon'ble Mr. Hopkinson delivered to the Board the new seal of the corporation, the same being executed agreeably to the directions of the Board of the 23rd of December last."

8 October, 1788 (Book IV—p. 17).

"The Seal of the Institution was given to the care of the Secretary."

8 July, 1789 (Book IV, p. 43).

"Resolved . . . : and that Dr. Hutchinson, Dr. Jackson and Dr. Collin be a Committee to report a device for a Seal for this Institution."

12 December, 1791 (Book V—p. 27).

"Mr. Burd and Mr. Smith were appointed a committee to prepare a greater and lesser Seal for the Corporation."

20 December, 1791 (Book V—p. 28).

"Resolved, that the Seal of the late University of the State of Pennsylvania be used as the Seal of this Corporation until new Seals are prepared."

4 April, 1848 (Book IX—not paged).

“On motion Resolved, that the following sketch of a seal * as reported be adopted as the seal of the University.”

“On motion Resolved, that the subject of breaking and defacing the old seals be referred to the Committee of Ways and Means with power to act.”

**ADDRESSES AT THE CORNER-STONE LAYING, THE WAR MEMORIAL
TOWER AND GATEWAY, UNIVERSITY DORMITORIES,
FEBRUARY 13, 1900.**

By the Provost.

GENERAL MILES, AND GENTLEMEN, STUDENTS OF THE
UNIVERSITY OF PENNSYLVANIA :

We are met to-day to lay the corner-stone of this Memorial Tower and Gateway, to commemorate the patriotism of sons of the University of Pennsylvania. We do not erect this structure as a lofty cenotaph ; we are not gathering material for a funeral pyre, soon to be destroyed ; we seek to build an edifice—beautiful, permanent and indestructible. We shall not gaze at this building from afar, as if it were a symbol of death or decay ; we have rather chosen that the memorial shall be so placed as forever to be a part of the life of the University in all its depth of meaning. Beneath this gate will pass—in these and future years—the thousands of those who will make this place their home. Within these walls will dwell others who may, in their turn, answer to the call of service. Here will be they who may enjoy the quiet contemplation of sharing in other victories—perhaps of other kinds—they, too, have won. Here may be other battles fought in those great struggles which a student-body wages oftener than the many know or care. Here may the depression of known defeat cast off its shadow, and from the names and recollections here inscribed and perpetuated may fresh courage be drawn for other efforts.

* See Figure 4.

It is not always or often that so high a purpose as this memorial contemplates, with all its richness and fullness of proportions, is realized. In the knowledge of us all, the general fate of such intentions is failure and abandonment. But it has not been so here. The end will be precisely that which has been had in view from the beginning. No stone will be taken away in diminution of the plan. It will stand complete and without offence of debt. Very many Pennsylvania men have had their part, but to the fidelity of one who is nameless to-day, but not unknown, we owe the chiefest gratitude. The completed work may well be a lasting monument of determination, at this University, to allow no obstacle but that of dishonor to stand in the way of full accomplishment.

It was in April, 1898, when the President of the United States made his call for troops. There was an immediate response from those who were then, or who had been, students, professors or officers of the University of Pennsylvania. It is well known that here, as doubtless elsewhere, very many more were ready and willing to go, but were dissuaded for the reason that at that time their services were not required. Perhaps there are not many officers of the University who were not obliged to reason with some colleague or student and show him that it was his present duty to remain at his work at the University. That duty fell upon me repeatedly, but not always with success. The facts as to those who went, and as to the part which the University of Pennsylvania men took in the Spanish-American war, are, in plain words, as follows:

The University was represented in every engagement of the war and notably at Manila, at Cardenas, at Guantamano, at Santiago and at Puerto Rico. Nine lost their lives, either in battle or through fever. I will name these nine: General Egbert, of the Class of '56 C.—soldier, scholar, gentleman—was seriously wounded at El Caney. He recovered, but afterwards was instantly killed on the

twenty-sixth of March, 1899, at the head of his regiment, at Malinta, Luzon.

Dr. John Blair Gibbs, '81 M., Assistant Surgeon, U. S. N., fell in battle at Guantanamo. He was the first American officer killed in Cuba.

Lieutenant Francis Lieber, '91 M., Assistant Surgeon, U. S. N., at Fernandina, Fla., died of typhoid fever.

Major Lawrence Savery Smith, '88 C. and '91 M., an instructor in the Medical Department, was Surgeon Pennsylvania Volunteers, U. S. A., in charge of the hospital at Puerto Rico. Major Smith was taken ill with typhoid fever at Puerto Rico and died on shipboard before reaching home. He was a man greatly beloved.

Lieutenant John B. Scott, '99 M., U. S. N., Acting Chaplain upon the auxiliary cruiser "St. Paul." Lieutenant Scott was president of the Houston Club, a man well known to the whole student-body. He, too, like Major Smith, was greatly beloved by all. He was more fortunate than Major Smith, in that he lived to reach his home, where he died from disease contracted in the service.

Other names are: Harrison G. Kimball, '96 C., a Private in Light Battery A, Pennsylvania Volunteers; Alexander Wilson Norris, '90 C., Adjutant Eighth Pennsylvania Volunteer Infantry; Frederick W. Peter, '96 C., Private, Hospital Corps, First Pennsylvania Volunteer Infantry; George Elliott, '96 C., Private, First Pennsylvania Volunteers, U. S. A.—who died of fever.

These are the nine University men who lost their lives in the Spanish-American war. In addition to General Egbert, some of the men who saw the most active service—whose names, happily, are not required in the casualty list with that of General Egbert—are:

John B. Bernardou, '77 C., in command of the torpedo boat "Winslow," at Cardenas.

On the "Olympia," with Admiral Dewey, on the first of May, 1898, were: William Phillips Biddle, '72 C., Fleet

Major of Marines in the Eastern Squadron; and Dr. Charles P. Kindleberger, '95 M., Assistant Surgeon, U. S. N.

Rear Admiral Christopher J. Cleborne, '60 M., had charge of the Spanish prisoners at Norfolk, Va., at the Naval Hospital. Since retired.

Brigadier General Louis H. Carpenter, '59 C., Military Governor, Department of Puerto Principe. Since retired.

J. Stuart Chaffee, '97 M., Assistant Surgeon, U. S. N., commended for efficient services in the Philippine campaign by Colonel Woodhull, Rear Admiral Watson and the Secretary of the Navy.

Lieutenant John F. Critchlow, '94 M., First Lieutenant Utah Artillery; served in the Philippine campaign with that command.

Eugene Ellicott, Assistant to the Provost of the University, was Captain in the Volunteer Regiment of Engineers.

Henry W. Spangler, Whitney Professor of Dynamical Engineering, was appointed to the position of Chief Engineer, U. S. N., and served during the war on the monitor "Montauk."

Lightner Witmer, Assistant Professor of Psychology, enlisted with the First Troop, Philadelphia City Cavalry.

Edgar A. Singer, Jr., Instructor in Philosophy, served in Puerto Rico, as Sergeant of the First Regiment, U. S. V. Engineers.

It was George L. Dart, '96 C., Consul at Martinique, French West Indies, who first advised the Navy Department of the arrival of Admiral Cervera's fleet in western waters.

Three men, then University students, were in the First Volunteer Cavalry, popularly known as the "Rough Riders," taking part in the fight of that regiment at La Quasima and the subsequent fighting before Santiago. The names of these three men are: F. Allen McCurdy, J. Kirk McCurdy, and Granville R. Fortescue, '99 L.

The First Troop, Philadelphia City Cavalry, and Light Battery A, Pennsylvania Volunteers, as well as the Volunteer Regiment of Engineers and other regiments from Philadelphia, and also the Naval Militia, contained large numbers of Pennsylvania men. Our men in other parts of the United States, particularly men from the Medical Department, were active in the service. Most of the Pennsylvania regiments had surgeons who were graduates of our University. The Chaplain of the Sixteenth Pennsylvania, which saw service in Puerto Rico, was Rev. Walter Biddle Lowry, '87 C.

The University has upon its rolls, as nearly as may now be ascertained, about eleven thousand graduates and students. We may reckon that of these probably seven thousand were within the age of military service, and were in physical condition to pass medical requirements. Of these seven thousand we find that about four hundred were in the government service during the war, so that 6 per cent of those available and eligible offered themselves and were accepted by the government.

It is our purpose to-day to commemorate the patriotism of the four hundred University men who rendered good service in the Spanish-American war—a war in which, although its results are to be permanent and unexpected, large numbers were not a necessity.

It is proper, in addition to the statement already made, to make record of other help, which cannot be overestimated, and which was rendered by the University. The University Hospital—now the largest hospital in the State of Pennsylvania—opened wide its doors for the relief of the sick and wounded; and not only this, but we may say without criticism that no other university rendered to the sick and wounded the service which this University afforded. There were equipped and sent out, entirely at the University's expense, six special hospital trains—one as far as Atlanta—to bring sick and wounded soldiers to the Univer-

sity Hospital. Here, under the best of treatment and trained nursing, the lives of very many men not of this University were saved to themselves, to their families and to the country. The percentage of mortality of these invalids—mostly extreme cases of typhoid fever—was extraordinarily low. We may say then, not only has the University sent of its own sons, but it has helped many others who were willing to run the same risk as her sons, and in the same cause.

But, sir, in conclusion, this Memorial Tower and Gateway is a memorial to the University itself. The University was here when this State was a Province, and when this country was made up of colonies of Great Britain. Long before men thought of independence, the University of Pennsylvania was preparing the minds of men for that change of political relationship; and there is no institution of learning which can show the same record in the War of the Revolution as the University of Pennsylvania. To its trustees, to its professors, to its students, there is as much due, if not more, as to any other single centre of influence. It would be idle, in the few moments devoted to the limits of this brief address, to attempt to name the University of Pennsylvania men in the struggle of '76, in the War of 1812, or in the Civil War of '61. Benjamin Franklin was trustee of the University from 1749 until 1790; Robert Morris, without whom there might have been no successful result, was a trustee from 1778 until 1791. His lineal descendant, we are proud to say, is in residence at this University, and almost within sound of my voice. Five of the first six students to be graduated here twenty years before the Revolution were either signers of the Declaration of Independence or in eminent service; one of them being physician-in-chief, under General Washington, to the American army. And when the silence of the watch in this town was broken one night, it was by the tidings which a University man of the Class of 1761 bore to the Congress, telling that "Cornwallis is taken!" He was

Tench Tilghman, Military Secretary and Aide-de-Camp to General Washington; so chosen by his chief.

In the same Revolutionary annals the names are recorded, among many others, of Major-General Dickinson, Major-General Mifflin, John and Lambert Cadwalader, Major-General Muhlenberg; and that clergyman and zealous patriot, Thomas Read; Major-General Brown, afterward General-in-Chief of the United States Army; Iszard and Powel and Wharton, Franklin Bache, Benjamin Chew, Jr., George Gray, and an ever-increasing number. And when we come to the later struggle for the preservation of the Union under one symbol,—I must ask you to accept these rolls which I now hold in my hands as bearing upon them the names of University of Pennsylvania men.

General Miles, we offer, then, to the Nation, this Memorial Tower, whose corner-stone you have laid. It is dedicated to the long history of service in Army and Navy of our University men. In the language of the greatest of all the historians of Rome: "May it ever stand here, that all nations of the earth may see that the drift of our armies and forces is not to bring free states into servitude; but contrariwise, to restore those that are in bondage to liberty."

By Major-General Nelson A. Miles.

It is fitting that the anniversary of the birth of Abraham Lincoln should have been selected as the appropriate time for this ceremony, and, although it occurs on the following day, yet the sentiments expressed in the many assemblages of yesterday remind us of the character of that illustrious patriot, liberator and statesman.

The ancient and refined Athenians builded the most magnificent temples that have adorned the earth, and dedicated them to the unknown gods. For many centuries they have stood, defying the elements of nature as well as

the bigotry, superstition and avarice of man, monuments of the high intelligence and culture of a classic people.

The temples and monuments erected by a people indicate in a measure the degree of enlightenment to which they have attained. The Alexandrian sarcophagus at Constantinople, the Coliseum at Rome, the marvelously beautiful courts and monuments at Pompeii, the Kremlin at Moscow, and the palaces and monuments in other ancient cities, as well as the colossal statues of Victor Emmanuel at Naples, Garibaldi at Rome, Catherine the Great at St. Petersburg, the statues to and the works of art of Peter the Great, which indicate the progress in art and science of that great people of the North; the statues of Gustavus Adolphus at Stockholm, Frederick the Great and Kaiser Wilhelm I. at Berlin, and the monument to Nelson in Trafalgar Square, London, most of which are dedicated to the memory of illustrious rulers or leaders of men, all are silent monuments of ancient and modern civilizations.

In our own country, comparatively new and not as rich in art as the old world, yet blessed with a progressive and enlightened civilization, we find some of the most beautiful temples in the world dedicated to the noble purpose of promoting universal knowledge among all classes of society. And it must be gratifying to you to know that a citizen of your State, a noble-hearted philanthropist—Andrew Carnegie—has done more to promote the establishment of public libraries than all others of his day.

In no other part of our country do we find so many monuments commemorative of heroic deeds and great sacrifices as in the State of Pennsylvania. On the hallowed ground of Gettysburg, where the legions of Meade won the Waterloo of America, there stand hundreds of monuments, silent witnesses of the patriotic devotion of a great people to a noble cause. One is impressed with the infinite variety of design and form, as well as with the exquisite workmanship displayed in these monuments, and they stand

as eternal tributes to the skill and culture of the artists and donors, as well as to the lofty sentiment which inspired the heroes who fought and fell on that immortal field.

Here in the grand city of Philadelphia we also find evidences of a patriotic and appreciative people. Standing high in mid-air, above all other structures in this great city, we see the magnificent bronze statue of him who, by his wisdom, generosity and high sense of justice, founded a colony which has developed into one of the most enlightened and progressive communities, and to which all the people of this great Republic can point with just pride. Here we find also the home and tomb of that illustrious scholar, scientist and philosopher, Benjamin Franklin. Here we find that magnificent monument dedicated to him who not only organized, moulded and directed our victorious army of liberty, but who was supreme in the council that founded and established this beneficent government. Here also we find a monument to that philanthropist whose enterprise and generosity has given Philadelphia a college that will ever be an honor to the name of Stephen Girard.

On this occasion we are gathered at this University, one of the oldest and most important of all the great universities of our country, to lay the corner-stone of a tower that shall "commemorate the services of the men of the University of Pennsylvania, and of the University itself, in the Spanish-American war." In every great cause in which our government has been engaged no community has contributed more of its life and treasure than that of the Commonwealth of Pennsylvania, and this is especially true of the city of Philadelphia. This great University has added new lustre to its history through the services rendered by its graduates and students who took part in the recent war in the cause of humanity. Their heroic deeds and sacrifices, from the fall of Gibbs at Guantanamo to the death of that veteran of four wars, Colonel Egbert, in the jungles of the Philippines, forms a record of patriotism and devotion

that will make one of the brightest pages in the history of this great University. In erecting such a monument to commemorate the noble deeds of such men, you do honor to yourselves, and at the same time inspire noble purposes and patriotic loyalty in the hearts of others.

This memorial is not erected to glorify the fierce carnage of war, but rather to symbolize that ennobling quality which is the highest in the life of a nation. Love of country is best expressed in war by the self-sacrificing courage that inspires its heroes and patriots. Palaces and plantations, railways and marts of commerce, inexhaustible mines and perpetual and bounteous harvests, are not the true measure of a nation's greatness. It lies rather in that intangible quality which you celebrate by this noble memorial—that sentiment of patriotism which sanctifies the individual and makes a nation truly great. War in itself is most deplorable, and far be it from me to advocate an appeal to arms, except as a last resort in a righteous cause; but war in a just cause develops and strengthens a nation, and brings out all that is noblest and inspiring in the human soul. While we may strive for universal peace, yet so long as mind clashes on mind, so long as material advantages weigh in the same scale with the spirit of liberty, humanity and justice, so long as oppression blocks the road to freedom, the engines of war will be the final arbitrators in the controversies of nations.

The deeds and sacrifices commemorated by this assembly to-day, and to be perpetuated by this Tower, will live in marble and bronze through the coming ages.

“ Patriots have toiled, and in their country's cause
Bled nobly; and their deeds, as they deserve,
Receive proud recompense. We give in charge
Their names to the sweet lyre. The historic Muse,
Proud of the treasure, marches with it down
To latest times; and Sculpture, in her turn,
Gives bond in stone and ever-during brass
To guard them, and to immortalize her trust.”

NEW REGULATIONS CONCERNING THE MASTER'S AND DOCTOR'S DEGREES.

The Faculty of Philosophy, at a meeting held on January 20, 1900, made some significant changes in the regulations under which candidates are advanced to the higher degrees.

The academic tradition of most American and foreign universities has hitherto required that candidates for the degree of Doctor of Philosophy should be examined orally by the entire Faculty of Philosophy, and that the Faculty as a whole should vote upon their fitness for that degree. The growth of the tendency toward extreme specialization, both on the part of the Faculty and on that of the candidates, has for a number of years past in many institutions made it impossible to comply with the letter of this requirement. A Faculty of Philosophy no longer consists of a body of men each of whom feels competent to examine a candidate in any subject. Each man is a specialist in a narrow field, and when the members of the Faculty assemble to hold an examination, it is perforce conducted by a few only; while the others, in many cases, are unable to judge whether the answers made by the candidate are right or wrong. This has led in many universities to the appointment of a Committee of the Faculty to conduct such examinations; and, although in theory the other members are expected to be in attendance, in fact the tendency has been for those members of the Faculty not immediately interested to absent themselves from the examination. Indeed, the examination has frequently been conducted in the presence of the Dean and three examiners only, all of the three examiners being already thoroughly acquainted with the candidate's worth. Further, it has been felt by many that serious disadvantages attach to the oral, as distinct from the written, examination. The oral examination tests a man's quickness of speech and presence of mind quite as much as it tests his knowledge of the subject in question. Again, no exact record being kept of the candi-

date's answers, the examiners must, in order to judge of the candidate's fitness, have recourse to their recollection of the general tenor of the examination.

In order to insure a more just appreciation of the candidate's worth, the Faculty ordained (in 1896) that a written examination should in every case precede the oral examination. During the three years in which this regulation has been in force its value has been demonstrated. The written examinations are much more prolonged than the oral, and proportionately more searching. The oral examination in the major subject usually lasts an hour: the written examinations from eight to twelve hours. The natural result of this policy has been a still further depreciation in the value of the oral examination. A candidate who has passed a good twelve-hour written examination in his major subject rarely will, and should not, be refused his degree merely because he becomes confused and does not do himself justice in an oral examination of one hour's duration.

It was to meet this state of affairs that the Faculty at its last meeting draughted the new regulations. The written examination will be retained in its present form, and its importance emphasized; but the character of the oral examination will be changed. Instead of appearing before the Dean and a committee of three examiners, the candidate will be presented to the entire Faculty of Philosophy in formal session, with the Provost in the chair. A representative of the Group Committee with whom the candidate has taken his major subject will spread before the Faculty the candidate's credentials. These will comprise a brief sketch of his academic life, a more detailed account of the scope and character of his work as a graduate student, of the examinations which he has passed, and more particularly of the scope and significance of his thesis. His presenter will then formally recommend him to the Faculty on behalf of the Group Committee as a candidate for the

degree of Doctor of Philosophy. After hearing the candidate's credentials read, any member of the Faculty may make further inquiries of the candidate or of the presenter; and a formal vote will then be taken upon the recommendation.

The regulations for the Master's degree will differ from those above outlined only (1) in the amount of work required; (2) in the fact that the Dean will act as presenter; (3) and that no reference will be made to a thesis.

Three other changes of importance have been made in the rules. The principle represented by the first of these changes, that of printing the thesis, has long been left to the option of the Group Committees, and has in fact been enforced by a majority of them. Hereafter every thesis must be printed, and 250 copies must be delivered to the Dean before the candidate is recommended by the Faculty for his degree. In this connection, the Faculty has recommended to the Board of Trustees that when the cost of printing the thesis exceeds a specified average of \$75, the university should assume the additional expense, provided this does not exceed \$50. The purpose of this recommendation is to equalize as far as possible the cost of printing, so that no student shall be deterred by fear of incurring too heavy an expense from presenting the university with the best thesis of which he is capable.

The two other changes affect the time at which the examinations may be held. Hitherto it has been required of all students that the thesis should be completed and approved, before the candidate is admitted to the final written and oral examinations in the major and minor subjects. Hereafter a student may pass his examination in a minor subject at any time after he has completed the work in that subject, and he may pass the examination in a major subject as soon as he has completed all the resident and lecture work required of him by his Group Committees; provided (1) that it is not less than twenty-four standard courses; (2)

that he has had one year of resident work in this University, and (3) that he has complied with the other formal rules relating to candidacy for the degree of Doctor of Philosophy. In all such cases the thesis must be accepted, printed, and 250 copies delivered to the Dean, before the candidate can be presented to the Faculty. It is believed that this modification will enable students to prepare a better thesis than was possible under the former regulations, which required that a student should complete his thesis and prepare for examination at one and the same time.

The fundamental principle which has guided the Faculty of Philosophy in the formulation of these modifications has been the substitution of publicity for formal rules, as a means of ensuring a high standard of scholarship in the men who receive the higher degrees. Not only will the printed thesis be distributed throughout the academic world, but it is the intention of the department to publish the credentials in the case of each candidate for the higher degrees, in order that any one desiring to ascertain the conditions under which these degrees are granted at this University will find the records open freely to inspection.

RELATIONS OF LENGTH AND STRENGTH IN THE FORE-ARM.

[Read before Society of College Gymnasium Directors, December 29, 1899.]

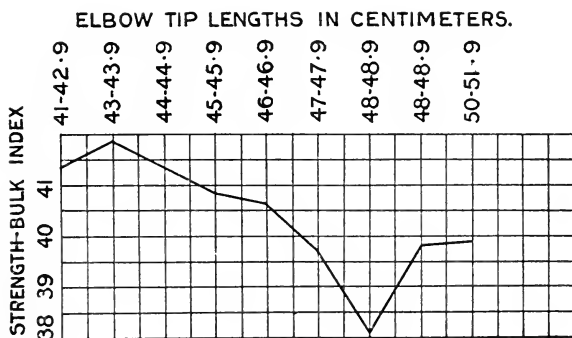
Over a year ago I published in the *BULLETIN* (Vol. III, No. 1, September, 1898) of the University of Pennsylvania a preliminary report on some experiments on the relative strength of fore-arms of different lengths. As the subject of the present paper is a continuation of those experiments, and as the results then foreshadowed have been substantiated by further work, I shall quote freely from the earlier paper.

The study was undertaken in order to ascertain the relative specific strength of the flexor muscles in connection with varying lengths of the fore-arm. By specific strength is here

meant strength per unit size, which is of course found by dividing the total strength by the number of units bulk. Obviously, in order to determine whether length, *per se*, has any influence on strength we must deal with specific strengths rather than total strengths, since a long arm is usually absolutely larger than a short one. The method of operating originally described remained unchanged, and was as follows: After taking the elbow-tip length, the arm was immersed in a tall cylindrical vessel provided with a spout. Before placing the arm in the vessel the latter was filled with filtered water level with the spout, so that as soon as the subject dipped his fingers into the water it commenced to run out, and continued to escape until the subject ceased to push his arm further down, which was not until the surface of the water touched the tip of his olecranon. The water so displaced measured the bulk of the hand and fore-arm, and was caught in a counterbalanced vessel standing on the platform of a special scale. The weight of this water in grams represented with sufficient accuracy the bulk displaced in cubic centimeters. By dividing the total strength as read from the dynamometer (the form used was the common elliptical spring), expressed in grams, by the bulk expressed in cubic centimeters, we get the specific strength, or *Strength-bulk Index*, as it may be called; and which, for the arm, is evidently analogous to the strength-weight index for the entire body. Of course, to this plan objection may be made that what we really measure is something very different from the bulk of the flexor muscles, namely, that of the entire forearm and hand; and even if the bulk of the hand were taken separately and subtracted from that of the forearm as a whole, we should still not be measuring the bulk of the flexors. But it seems reasonable to suppose that the bulks of the different muscles, bones, etc., maintain the same average proportion for different absolute sizes, though the demonstration of this is impossible in the living subject. It is evident, however, that the strength-bulk index as here defined does not represent the real strength per cubic centimeter of flexor muscle, but must always give a much lower figure, useful not as an absolute measure, but for comparison.

The average strength-bulk index derived in the manner

described is plotted for each length of fore-arm in the following curve. The number of experiments was 731, with students from various classes and schools of the university. This number includes a few (about ten) who by mistake were measured twice, though at intervals of a year. The elbow-tip lengths met with are divided into nine classes, as shown by the figures at the top of the diagram. With exception of the two terminal groups, each position on the chart represents a progressive difference of one centimeter in length. Thus the average for all lengths falling between 43 and 43.9 occupies the second position, all between 44 and 44.9 the third, etc. The first and last positions, on the contrary, include the averages of all lengths between 41 and 42.9, and 50 and 51.9 respectively, this extension having been thought desirable on account of the comparatively small number of cases falling in these groups.



It will be seen that the curve so formed is lowest for the elbow-tip lengths 48-48.9, from which point it rises in either direction, although much more strongly toward the end representing the shorter lengths. In other words, the curve would indicate that short arms are specifically strongest, long arms next strongest, and those of medium length the weakest. This result appears somewhat anomalous. Short arms usually belong to short men; and, if the curve fell regularly from the shortest to the longest, we should see merely a confirmation in

a special case of the general fact that short men usually have greater strength per unit weight than tall ones. Thus, we may suppose that owing to his sharper and more quickly available energy the short man excites his arm more strongly and efficiently during the sudden squeeze on the dynamometer; or we may hold that since, bulk for bulk, the short muscle mass contains more fibres than the long, the contraction of the short arm will also be more powerful. But granted that these two factors acting together account for the advantage of short arms, we should expect that the curve would fall continuously from left to right. Yet such is not the case, and we must search for some reason for the abrupt rise for very long arms. The following is offered as a probable explanation: We know that the distance through which a load may be moved as the result of a given stimulus will depend on the length of the fibres, just as the weight of the possible load depends on their number. Therefore, a less amount of compression of the dynamometer will exhaust the capabilities of a given contraction impulse in a short arm than in a long one. But this is not all. The instrument is so placed in the hand that at the beginning of the squeeze the fingers enjoy the best possible position as regards flexion, firmness, etc., while it is evident that at the end of the trial, which is exactly the point where the greatest demand for power is made, the relation of the fore-arm to the fingers, and of the latter to the spring, will have changed so that the full force can no longer be realized. As soon as the resultant of compression of the fingers fails to correspond with the axis of resistance of the spring, some of the force must be used up to neutralize the new resultant produced by this discrepancy, which tends to rotate the spring on its long axis, and so cause it to slip either toward the palm or the end of the fingers. Even after sacrificing part of his strength in this effort to keep the dynamometer from slipping, the subject is not always successful; as is shown when the instrument is squeezed entirely out of his hand and dropped, or more frequently by the complaint: "I could have done better if it hadn't slipped." If this difficulty were constant for different lengths of fore-arm it would not influence their comparative efficiency. But it is evident that in order to compress the spring a given distance

short fingers will have to bend through a greater angle than long; short flexor muscles will have to contract a greater percentage of their total range than long ones;—in brief, the whole situation will have changed more at the end of the trial for a short arm than for a long one, and the mechanical handicap will diminish as the arm grows longer.

On the above hypothesis the values of the curve are controlled by two opposing conditions. The advantages of the short arm at first completely dominate; they then gradually grow less and are completely nullified at the lengths .48–.48.9, from which point the advantages of the long arm cause the curve to rise rapidly. It will be seen that this second rise is the result of adventitious conditions brought about by the fact that the dynamometer does not oppose a rigid resistance to the force applied. In a rigorous test neither of the circumstances favoring the long arm should be allowed. As soon as the distance through which the dynamometer moves becomes the determining factor in the case, what we really measure is not the pressure at a given point, but the distance through which an increasing pressure can be maintained. Of course, we cannot have a dynamometer with absolutely no motion, but we could have one whose range of motion should be very much less than that of the elliptical spring pressed on from the side. With such an instrument I believe that the curve would fall from one end to the other.

CASPAR W. MILLER.

ABSTRACTS OF RECENT PAPERS.

Quantity in English.

MORTON W. EASTON.

[Read before the Language Union, December 7, 1899.]

The paper contained a discussion of the question of the proper quantity of the syllable in English, in and out of stress. The position taken was that the facility with which, in our pronunciation, many sounds can be reduced to glides, prevents us from assuming the existence of such permanent quantitative relations as seem to have been demanded for the

classical metres. Two syllables containing a different number of phonetic elements do not necessarily differ in the time required for their enunciation.

The question of the position in our verse system of certain words ordinarily unstressed, such as *is*, some prepositions, articles, etc., connects with this theme. Our dislike to the use of such words in the stressed place in verse is not due to considerations having to do with their quantity. Any such word may be colloquially protracted, and very often is. It is rather due to a severance, of quite modern date, between the colloquial and the poetical vocabulary. And this severance has been extended to our higher prose style and even to our graver colloquial style. Humorous verse may violate the rule.

Arrangement of Buildings in the Market-place at Athens.

H. WILSON STAHLNECKER.

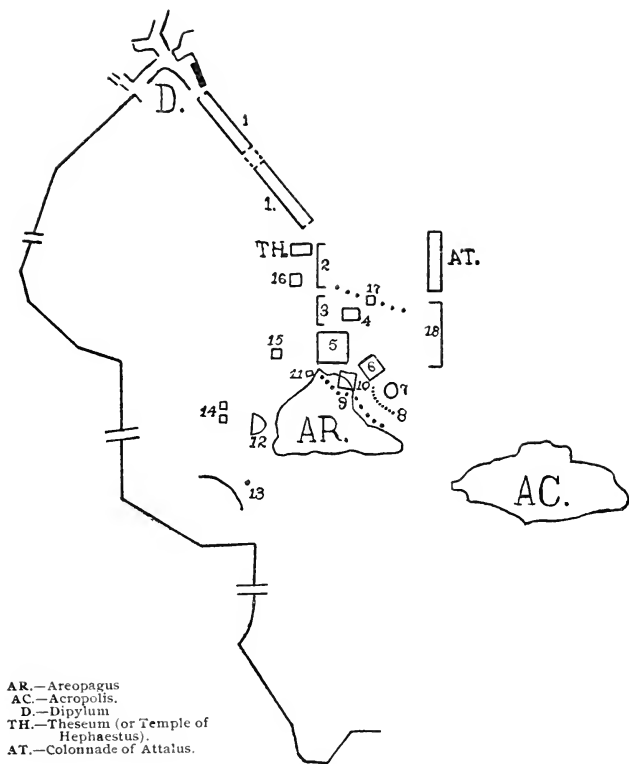
[Read before the Language Union, December 7, 1899.]

The Market-place at Athens is the first important part of that city described by Pausanias. He generally calls it the Ceramicus, a name which was applied to this part of the city, and which he used for the sake of clearness, as there were two market-places at Athens, the regular Athenian agora and the later one established by the Romans.

The question of the location of the buildings in the agora depends largely upon the gate by which Pausanias entered Athens. There were four gates by which he might have entered, but of these the Dipylum seems the most probable.

The first building which Pausanias describes is the Royal Colonnade. This colonnade must have been situated on the west side of the market-place, at the foot of the hill on which the so-called Theseum stands, for this Theseum has been almost positively identified with the Temple of Hephaestus, which Pausanias tells us later is situated above the Ceramicus and the Royal Colonnade. Next to this he sees the Colonnade of the Twelve Gods, which he says is beyond the Royal Colonnade. The word he uses is *ὀπίσθην* "behind," but we may render it as above, for Pausanias stands at the northeast corner of the Royal Colonnade and sees the Colonnade of the Twelve Gods projecting beyond the end of it. Pausanias' next reference is to a statue of Apollo, surnamed Paternal, in the temple hard by. Nothing more is said about this temple, nor have any remains of it been discovered, so we may locate it just east of the Colonnade of the Twelve Gods, for we are near the Areopagus, and as the Metroum is near and of considerable size, there would probably not have been room for a temple between it and the Colonnade of the Twelve Gods.

"There is a sanctuary also of the Mother of the Gods. Near it is the Council House of the Five Hundred." (I, 3, 4.) "Near the Council



CONJECTURED SITES.

- | | |
|------------------------------|---|
| 1. Colonnades. | 10. Sanctuary of Ares. |
| 2. Royal Colonnade. | 11. Statues of Harmodius and Aristogiton. |
| 3. Colonnade of Twelve Gods. | 12. Music Hall. |
| 4. Temple of Apollo Patroos. | 13. Enneacrunus. |
| 5. Metroum. | 14. Temples of Demeter, etc. |
| 6. Council House. | 15. Temple of Good Fame. |
| 7. Rotunda. | 16. Temple of Aphrodite. |
| 8. Eponymous Heroes. | 17. Bronze Hermes and Gate. |
| 9. Various Statues. | 18. Painted Colonnade. |

House of the Five Hundred is the so-called Rotunda. . . . Higher up stand statues of the heroes from whom the Athenian tribes afterwards got their names." (I, 5, 1.) This must mean that the statues stood on the slope of the Areopagus above the Rotunda. The three buildings, therefore, seem to have stood at the south end of the market-place, just at the northern foot of the slope of the Areopagus. Moreover, we know from Arrian that the Metroum was in the Ceramicus opposite the statues of the tyrannicides, Harmodius and Aristogiton, at the point where people ascended from the market-place to the Acropolis. This road was formerly supposed to be on the east side of the Areopagus, but Dr. Dörpfeld recently excavated a road on the western side, which is in all probability the one in question. We shall say, then, that the Metroum stood on the northwest slope of the Areopagus, with the Council House and Rotunda immediately to the east of it.

"After the statues of the eponymous heroes, there are images of gods, to wit, Amphiarus, and Peace carrying the child Wealth. Here is a bronze statue of Lycurgus, son of Lycophron, and another of Callias. . . . There is also a statue of Demosthenes. Near the statue of Demosthenes is a sanctuary of Ares, where are two images of Aphrodite. . . . Here, too, is an image of Enyo. . . . Round about the temple stand images of Hercules, Theseus and Apollo, and there are statues of Calades, and of Pindar. Not far off stand statues of Harmodius and Aristogiton, who slew Hipparchus." (I, 8, 3-5.) These passages are important, for upon the location of these statues depends the route which Pausanias followed. The first word "after" is *μετὰ* in the original, which might be translated more freely "next after" or "behind the statues," etc. This would place the statue of Amphiarus on the Areopagus, very near the cave of the Furies, with whom he might well be associated as a deity of the lower world. Now these statues, Amphiarus and Peace, are the first of a number of statues which Pausanias here mentions, and the last are the statues of Harmodius and Aristogiton, which we believe to have been at the northwest end of the Areopagus. We therefore infer that now Pausanias, in a way, retraces his steps from east to west along the slope of the Areopagus, back of the precinct of the Metroum. He would thus pass the statues of Amphiarus, Peace, Lycurgus, Callias and Demosthenes, near which is a sanctuary of Ares. This sanctuary was very probably situated near the northwest end of the Areopagus, for in the same section Pausanias tells us that the statues of Harmodius and Aristogiton stand not far off. The images of Aphrodite, Enyo, Hercules, Theseus and Apollo, and the statues of Calades and Pindar were situated along the northern slope of the Areopagus, near the sanctuary of Ares.

The statues of Harmodius and Aristogiton are said by Arrian to have stood in the Ceramicus at the point where people ascended from the market-place to the Acropolis. (*Anab.* III, 16, 8.) The location of this road was doubtful until recently, but Dr. Dörpfeld has shown by excavations that it ran up the *west* side of the Areopagus, and not the east. It fol-

lows that the statues of the tyrannicides were at the northwest corner of the Areopagus.

Pausanias now passes out of the market-place on a circuitous route, visiting in turn the Music Hall, a spring which he calls Euneacrunus, Temples of Demeter and the Maid, Temple of Good Fame, and finally reaching the Temple of Hephaestus, and that of Heavenly Aphrodite. His course has been, in general, first south, then northwest and north. The Temple of Hephaestus, he tells us, is above the Royal Colonnade. He has thus come back to his starting-point, and again goes into the agora, where he first entered it.

"On the way to the colonnade, which, from its paintings, they call the Painted Colonnade, there is a bronze Hermes, surnamed Hermes of the Market, and near it a gate." (I, 15, 1.) This statue was only one of a number of Hermæ, which extended in a row from the Royal Colonnade towards the Painted Colonnade. The direction of this row of Hermæ depends, therefore, on the position of the two colonnades. Now we know the position of the Royal Colonnade, but we get no hint from Pausanias as to the location of the Painted Colonnade. It may have been situated on either the northern or the eastern side of the Ceramicus. If we accept the first of these, we make Pausanias' silence as to the Colonnade of Attalus more inexplicable than ever, for if he had come up to and entered that building he would surely have mentioned it. If, however, we place the Painted Colonnade south of and in a line with the Colonnade of Attalus, we may imagine that in crossing the market-place Pausanias saw the two buildings before him and chose to visit the Painted Colonnade as being the more famous of the two, and then passed out of the agora and on to the gymnasium of Ptolemy. The row of Hermæ, therefore, probably extended across the middle of the market-place, with the bronze Hermes and the gate about in the middle.

By this reconstruction of the buildings in the Ceramicus we see that Pausanias went along the western and southern sides, and then retraced his steps eastward and, by a circuitous route, northward to the so-called Theseum, whence he started out, mentioning the buildings and statues on the way. He then re-entered the market-place, and passed over to the Painted Colonnade on the southeastern side, down to its southern end and thence out of the Ceramicus.



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THE CONRIED PLAYS AND THE GERMAN PUBLICATION FUND OF AMERICA.

The plan of the German Publication Fund of America is the natural outgrowth of one phase of the work of the German department during the last five years. Attention was directed to the "cultural relations of Germany and America" by the present head of the department in his inaugural address, delivered at the opening of the Bechstein Library, March 21, 1896, and a course of lectures on "German Influence on American Literature" was offered as a preparation for work in this field. In the spring and early summer of the same year a new periodical was projected, which should be devoted in large part to this field of research. In the following autumn the first announcement of the periodical was made, and in December the new journal, entitled "*Americana Germanica; a Quarterly devoted to the Literary, Linguistic, and other Cultural Relations of Germany and America*," (the first number dated 1897), was published by The Macmillan Company, and is still continued. In the autumn of 1898, work was begun on the history of the German drama and stage in America; while in May, 1899, a series of studies was announced under the general editorship of M. D. Learned, with the special co-operation of O. F. Lewis and C. W. Prettyman. At a dinner given to Manager Heinrich Conried by the German department of the University, the first public proposal of the plan to establish the "German Publication Fund of America" was made and discussed. The editors of the *Americana Germanica* had already received articles too lengthy to be published in the journal, while the studies under way were of such a character as to require publication in separate monograph volumes. It was these exigencies that led to the final plan of the Publication

Fund. The following self-explanatory circular has since been issued:

"The German contribution to American history and culture has been by far the most important from the continent of Europe, and the ethnographical history of America, which is likely to be the history of the near future, must draw largely upon the study of the influence of the German people in the development of American life and institutions. The increasing interest in this German influence is fast extending to the Anglo-Americans, and many serious and well-trained investigators are turning their attention to this new field of research. A large amount of matter in the form of *original documents* and *special studies* is already awaiting publication, thus making it desirable and necessary to establish a permanent fund for the publication of matter relating to the history of the Germans in America. The plan of this publication includes all matter of a scientific and documentary character touching the "literary, linguistic and other cultural relations of Germany and America," with such specific divisions as the following:

1. The Literary Relations of Germany and America.

- a.* German Literature written in America.
- b.* German Literature reprinted in America.
- c.* American Translations of German Literature.
- d.* The Influence of American Literature in Germany.

2. The Linguistic Relations of Germany and America, comprising the German Dialects of America and the Influence of the German Language.

3. The German Drama and Stage in America.

- a.* The German Drama performed on the German Stage in America.
- b.* The German Drama on the English Stage in America.
- c.* The Literary Influence of the German Drama in America.
- d.* The German Drama written in America.

4. German Music in America.

- a.* The History of the German Music Societies in America.
- b.* The Influence of German Music on American Culture.

5. German Turner and other Societies in America.

6. German Art in America.

7. German Science, Philosophy, Theology and Educational Methods in America.

8. Commercial Relations of Germany and America. German Industries, Trades, and Mechanical Arts in America.

9. The German Press in America.

- a.* The Native German Press.
- b.* The Relations of the German to the American Press.

10. The Diplomatic Relations of Germany and America.

11. The Germans in American Wars.

12. German-American Biography.

The organization of a National Committee of the German Publication Fund of America was set on foot at the University of Pennsylvania, in May, 1899, and a Local Executive has been constituted as follows:

President—Dr. C. J. Hexamer, President of the German Society.

Treasurer—C. C. Harrison, Jr., 123 South Fourth Street, Philadelphia.

Secretary—M. D. Learned, Professor of German at the University of Pennsylvania.

The National Committee, consisting of representative Germans and Americans, is being constituted of persons who are willing to guarantee contributions ranging from \$100 to \$5000 to the Fund. Smaller amounts will be gladly received. The sum asked for is \$100,000, which will be so invested as to secure a permanent income for the publications and to make all matter available as soon as ready for publication.

To all members of the National Committee copies of the works published out of the Fund will be sent gratis.

The names of the contributors will be published with each separate volume or monograph.

All matter submitted for publication will be expected to reach a high academic standard in order to be accepted.

Subscriptions of money and contributions of original studies (written in English or German) or other material, manuscripts or prints, will be welcomed from any part of the world.

The publications will be circulated through the regular channels of the book trade, and the proceeds from sales will be applied to the Fund.

The publications thus put on a permanent basis will constitute a splendid and lasting *monument to the Germans in America*.

Subscriptions may be sent by check direct to the Treasurer, *C. C. Harrison, Jr., 123 South Fourth Street, Philadelphia, Pa.* Subscribers, who so prefer, may pay their subscription in five or ten monthly instalments."

At the dinner above mentioned, Mr. Heinrich Conried, Manager of the Irving Place Theatre, of New York, made the first contribution to the Fund by offering two benefit German plays; one of the classical period of the eighteenth century, and the other from the contemporaneous nineteenth century German drama. In fulfillment of this promise, Mr. Conried has given, at the Academy of Music, under the auspices of the University, Lessing's *Minna von Barnhelm* and Fulda's *Jugendfreunde*.

The first play, *Minna von Barnhelm*, was performed

December 5, 1899, by a strong cast from the Irving Place Company. It was made up as follows :

Minna von Barnhelm	Martha Schiffl
Franziska	Emmy Schroth
Major von Tellheim	Paul Faber
Paul Werner, Wachtmeister	C. Bender
Just, Bedienter	Franz Kierschner
Riccaut de la Marliniere	A. Meyer-Eigen
Wirth	Max Hänseler
Wittwer	Slava Roberts
Diener	Jacques Lurian
Feldjäger	Carl Frischer

This was a notable event in the history of the German stage in Philadelphia. The audience was composed of the most representative people of Philadelphia and vicinity. Both English- and German-speaking lovers of the drama thronged the Academy to see this great comedy of Lessing. Hundreds of school and college people, who had read the play, came to see it as it left the hands of Lessing, performed by the foremost German company in America.

The artists admirably sustained the reputation of Mr. Conried as a master of the stage, who believes, like the old Greeks, that the details of a work of art are as essential to its perfection as the most prominent features of face and form. It was this principle of harmonious *ensemble* which made this performance of *Minna von Barnhelm* one that must have elicited the highest approval of the great critic Lessing himself. The artists interpreted their rôles with great fidelity to history, furnishing a faithful picture of German life of the time of Frederick the Great. Martha Schiffl as "Minna," "the sweetest, most lovely, gracious, best being under the sun, now and then a little mischievous, here and there a little stubborn"; Emmy Schroth as "Franziska," the keen, clever, pert miller's daughter; Paul Faber as "Tellheim," the brave and honorable soldier from the service of Frederick the Great;

C. Bender as "Paul Werner," the romantic soldier, happy-go-lucky, generous-hearted, right jolly good fellow; Franz Kierschner as "Just," the coarse, savage servant, with poodle-like fidelity to his master; A. Meyer-Eigen, as "Riccaut," the French gambler, a degenerated "*miles gloriosus*"; Max Hänseler as the inimitable "Wirth;"—all furnished an object-lesson of the highly developed technique of the classical German stage of to-day, showing the result of a faithful adherence to the best principles of histrionic art.

The second play was Ludwig Fulda's *Jugendfreunde*, performed March 21, 1900. The cast was as follows:

Dr. Bruno Martens	Gustav von Seyffertitz
Philip Winkler	Georg Baselt
Heinz Hagedorn	Rudolph Senius
Waldemar Scholz	Julius Strobl
Dora Lenz	Frieda Brandt
Amelia Siebert	Marie Reichardt
Toni Leitenberger	Anna Leonardi
Lisbeth Gerlach	Elly Collmer
Stephan	Jacques Horwitz

This play is an up-to-date German comedy, written by a man who is fully acquainted with the history of the drama, and himself a dramatic critic and historian of high rank. The *Jugendfreunde* was familiar to but few German or English-speaking people in the audience, and was for that reason a more severe test, both of the play itself and of the players, than was the case with *Minna von Barnhelm*, of which most of even the English-speaking spectators had some previous knowledge. Notwithstanding the novelty of the play, there was a large attendance at the performance.

The artists this time were "die Modernen" of the Irving Place Company, who were keenly alert to the difficulties of their task, with a mammoth play-house, an English and German audience, and an unfamiliar play with practically

no scenery to aid in the effect. It is a high testimony to the ability of the players, both as interpreters and performers, that from beginning to end, in the face of all these odds, they had the appreciative attention and hilarious applause of the composite audience. In this play everything depended upon action and harmonious *ensemble*, and the actors themselves expressed their gratified astonishment at the response of the spectators to the sparkling German humor and minute details of the dramatic action.

The *dramatis personæ* of this play, so indicative of a great variety of tastes and provincial points of view, present many of the most characteristic phases of modern German life. The plot is one requiring the closest reproduction of professional and provincial mannerisms in such a manner as to put each performer on his mettle, and to give each the opportunity of becoming a star. At the close of the play it would have been difficult to determine with precision the magnitude of these separate stars, so evenly were the various *rôles* presented.

In order to facilitate the understanding of the play for the English spectators, and as a permanent souvenir of Mr. Conried's performances, an English translation of the play was published for the occasion under the title *Friends of Youth*.

It is expected that the net proceeds of the two benefit performances given by Mr. Conried will amount to several hundred dollars. This original contribution is likely to receive a very considerable increment in the future, as Mr. Conried has generously offered to give the same number of plays during the next academic year. It has long been the custom of theatrical companies to give performances for the benefit of actors and charities, but the offer of a manager to lend, not only his company, but his private purse to the advancement of scientific research, is, so far as is known, unique in the history of the stage. For in both

these performances Mr. Conried freely defrayed the expenses of the entire cast, both to and from Philadelphia.

The importance of such artistic dramatic performances as an agency in academic education has never been duly recognized by our American colleges and universities; and this new stimulus which Mr. Conried has given to the student, not only of the University of Pennsylvania but also to Columbia, Harvard and Cornell, is likely to bear fruit in a more intelligent attention to the academic study of the drama and the stage in America.

THE NEW WING OF THE LABORATORY OF HYGIENE.

In the spring of 1899 the Medical Faculty of the University of Pennsylvania recommended to the Board of Trustees that the teaching of bacteriology be transferred from the Laboratory of Pathology to that of Hygiene, and that the Professor of Hygiene be made the Professor of Bacteriology as well. Both of these suggestions met with the approval of the Board, and the changes were therefore ordered.

This rearrangement necessitated not only a modification of the curriculum as regards this branch, but an increase of facilities for the proper instruction of large undergraduate classes, the Laboratory of Hygiene at the time being provided with neither sufficient laboratory accommodations for practical class work nor with a lecture room of suitable size. The demand for such increase of accommodations as were necessary to meet the new conditions was promptly met by the Board of Trustees, who ordered the erection of a new wing to the already existing building. Work on the new structure was begun in the spring of 1899 and was finished in time for the opening of the session of 1899-1900.

Thinking that perhaps a description of the plans fol-

lowed in the construction of this addition to our building might prove of value to other institutions contemplating the erection of laboratories or lecture rooms for similar purposes, the writer proposes to describe here these improvements with more or less detail.

The problems that presented at the beginning of the work were to provide a lecture room with seating capacity for not less than 300 students, and a laboratory with comfortable desk space for as large a number of students as possible, this number under no circumstances to be less than 75 working at one time. These figures are more or less fixed by the conditions at the University of Pennsylvania, that is, the classes to receive didactic instruction in the lecture room, namely, the Second-year Medical and Fourth-year Medical, and the Third-year Dental classes, range in numbers from about 150 to 225. At times it might be desirable to have the room occupied by two classes during the same period. We were, therefore, obliged to contemplate not only this latter possibility, but a growth in the size of the individual classes as well. The minimum figure given for desks in the laboratory is approximately that representing "a section" (that is, one-third) of the entire number of men usually found in the second year of their medical studies, the part of the course in which it was deemed best to place the teaching of practical bacteriology.

As to the location of this addition to the building there was no alternative, since the only available space lay to the southern end of the Thirty-fourthth street front. Externally the structure conforms in lines and finish to the original building; that is to say, it is of red brick trimmed with brown stone and terra cotta, and two stories in height.

Internally there were three points of construction in particular on which the writer was especially insistent, and from experience thus far gained there are no grounds

for regret. These features are :—hard wood floors; steel ceiling for the lecture room; and walls devoid of plaster.

Personal experience, as well as that gained by others, has taught us the importance of these demands. A plaster ceiling in a laboratory is likely to fall at any time should, through accident, which is not rare, the floor of the overhead room become flooded with water. The writer has had such an experience. Plastered walls in a laboratory, unless painted, become soiled and are always difficult to maintain in a tidy condition. If painted, this must be repeated from time to time, and they are, therefore, a constant source of expense. The objections usually raised against bare brick walls are that they reflect less light and that they favor the condensation of moisture upon them. These objections are readily met by the use of light-colored smooth brick, and by the laying of them with an air space between the external and internal walls. Hard wood floors were adopted more for economy than elegance, and maple was preferred to yellow pine for the reason that the latter, being a long grained wood, is apt to splinter with hard usage unless the very highest grade material be employed, and even then it must be kept continuously varnished and oiled; whereas no such accident is likely to occur with the close-grained maple, even though it be given much less care.

The lecture room occupies the first floor. It is about square, being 52 x 56 feet. The seats extend straight across it, rising on 8 to 9 inch steps from the lecture table to within 9 feet of the opposite wall. There is a centre aisle of 2' 8'', and an aisle along either lateral wall of 3' 6'' in width. The walls are of pressed brick laid in mortar of corresponding color and smoothly finished. For a distance of five feet above the floor the color of the brick is chocolate, above that it is a light buff or cream color. The ceiling is of paneled steel painted with zinc paint to match the lighter parts of the walls. It is 17' 6'' high at the point occupied by the instructor's table, and diminishes in height

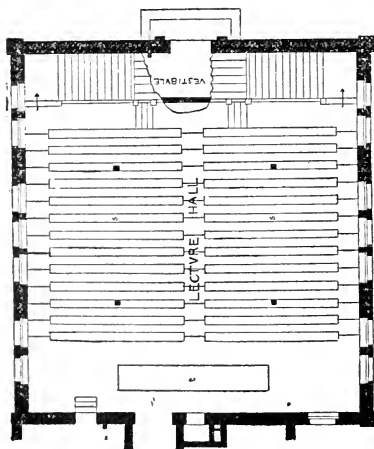


Fig. 1.—Floor plan of lecture room showing arrangement of seats (s), the position of instructor's table (t), and the vestibule and stair-cases by which the students enter the room.

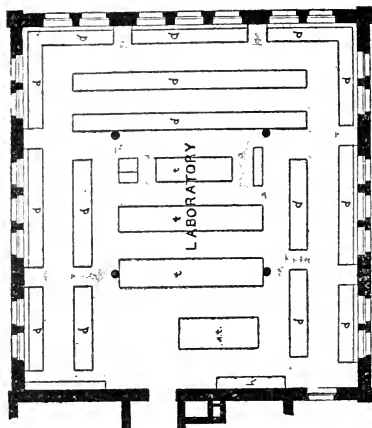


Fig. 3.—1st floor plan of Laboratory showing the position of the desks for microscopic work (d), of the centre tables (t), of the instructor's table (i), and of the hood (h).

as it recedes toward the portion of the room occupied by the highest rows of seats to 8' 4". The seating capacity of the room is 310. The seats are comfortable church pews of oak finished in the style known as "antique." They are subdivided by cast-iron arm rests 19" apart; the object of this being not only to insure sufficient room for comfort to each individual, but to discourage any tendency to lounge on the part of the occupants. The distance between the backs of each row of seats is 2' 8".

The illumination is supplied by rows of windows extending up to the ceiling on the east and west walls. Ventilation is through a large stack heated by steam coils. Heating is in part by direct radiation from steam radiators in the room, and in part indirectly from large steam coils placed beneath the perforated stairways entering the room. Besides the large lecture table, provided with gas, sinks and water for such demonstrations as may require them, there are movable racks for the exhibition of diagrams used in the lectures. The room is provided with electricity for lighting in the event of its being required at night, and also with the necessary electric call bells.

The students gain access to the room directly from without through a vestibule doorway located in the south wall. Two iron staircases 7 feet in width lead to the further end of the higher tier of seats. The entrance for the instructor is either behind the lecture table directly from the laboratory hallway, or by a door to the left of this from the adjoining preparation room. (See Figs. 1 and 2 for general arrangement.)

On the second floor, immediately over the lecture room, and of the same shape and area, is the laboratory for practical work in Bacteriology. As in the lecture room the walls are of pressed brick, buff above and wainscoted in chocolate color below for five feet above the floor. The ceiling increases in height from the walls, where it is fourteen feet, to the centre of the skylight where it is about

twenty-four feet high. The floor is of maple, well laid, stained, oiled and varnished. With a large skylight and with windows in three walls of this room the illumination is all that could be desired.

As a large part of the work done in this room requires the use of the microscope, the desks at which the men work are arranged around the walls facing the windows (see Figs. 3, 4 and 5). Parallel with the east and west walls are two rows of desks with an aisle of 5 feet between them, while across the southern end of the room there are three such rows separated by aisles of 3' 6" from each other. These desks, made of poplar, are joined together in sets of from four to six as convenience required. On the low partition (about two inches high) dividing one desk from another are gas and water. The latter is syphoned from large bottles held in suitable iron racks. We regard this as preferable to water taps from the regular house supply for the reason that the latter, even though filtered, is often objectionable, while the bottles can always be kept filled with distilled water. By this plan we also eliminate the frequent annoyance of obstructed drain pipes. The superficial dimensions of each desk are 3' wide, 2' 3" deep, and 2' 8" high. Each desk is supplied on the right hand side with a drawer and locker one foot wide extending through the entire depth of the desk, while beneath the top of the desk and well out of the way is a shelf, inclined toward the back, large enough to easily accommodate an overcoat and a hat, thus obviating the necessity of special coat lockers. The body of these desks is, like all other wood fittings of the room, finished in the natural color of the wood, oiled and varnished. The tops of all desks and of other tables in the room are finished in black, with lamp-black and paraffin. This finish is so far superior for laboratory purposes to anything else with which the writer has had experience that a detailed description may be of service. It is obtained by rubbing into the



Fig. 2.—View of lecture room looking toward the instructor's table.



freshly dressed desk top a mixture of lamp-black and turpentine until the wood is thoroughly soaked with it. All excess of the black is then carefully removed by thorough rubbing with cotton waste or with old rags. After this paraffin, of a high melting point, is ironed into the wood with a hot iron. The excess of this also is finally removed by thorough rubbing. The result is a comparatively dull black finish, very restful to the eye, an excellent background, and a finish that is not injured by the ordinary chemicals, staining solutions, or warm objects that may get upon it. Under no circumstances should a laboratory table or desk be varnished.

The tops of the desks are not screwed or nailed to the bodies in the ordinary manner, but are held in place by screws passing through slots in such a way as to allow the wood to shrink without cracking. Up to the time of writing this device has fully met our expectations.

On three walls of the room are glazed lockers for microscopes. Each locker is numbered to correspond with a desk, and each student on entering the laboratory for work is supplied with a desk, locker, and the keys for the same, for all of which and their contents he is held responsible. The glazing of the microscope lockers is an advantage in permitting a ready inspection by the instructor of the contents without his being obliged to open the locker. There are no angles to the tops of the desks, all corners being rounded to facilitate cleansing.

In addition to the desks, there are four large tables in the laboratory that are used for such work as the preparation of culture media and the demonstration of autopsies, dissections, etc. These are supplied with sinks, hot and cold water and gas. Beneath these tables are lockers for the use of the students, each locker being numbered to correspond with a particular desk.

On the north wall of the room are the necessary shelves and closets for apparatus and materials, and to the right

of the door leading into the room is a commodious glass hood, the framework of which is of iron, the base of soapstone, and the back of brick. This hood, as is usual, is provided with gas, water and aspirating flues. Care should be given to the glazing of an iron hood. The glass should never be firmly cemented in the frames, as it is sure to be cracked by the expansion and contraction of the surrounding metal. This has been our experience. It should be either loosely set, or set in some elastic material that will relieve the strain upon it.

The instruction given in this laboratory is entirely undergraduate, being restricted to the Second-year Medical and the Third-year Dental students. The work is practical, and occupies two and one-quarter hours daily for twenty-eight consecutive working days.

On entering the laboratory each student is supplied with desk and lockers, as stated, and with a microscope of approved pattern, including an oil immersion lens, staining reagents, test tubes, dishes, funnels, flasks, a gas stove, a Bunsen burner, and in short all the apparatus, except slides, coverslips, forceps, towels, note books, etc., that are necessary to the successful performance of the exercises that we regard as properly belonging to a course of this character. No charge is made for any apparatus unless it be injured or destroyed. The capacity of this room is eighty-three students working at one time. The room is heated by steam, and well ventilated.

The total cost of the addition to the building was a trifle over fifteen thousand dollars, the operation being under the supervision of Mr. L. H. Duhring, of the firm of Duhring, Okie & Ziegler, architects, of Philadelphia.

ALEXANDER C. ABBOTT,
Director of the Laboratory.

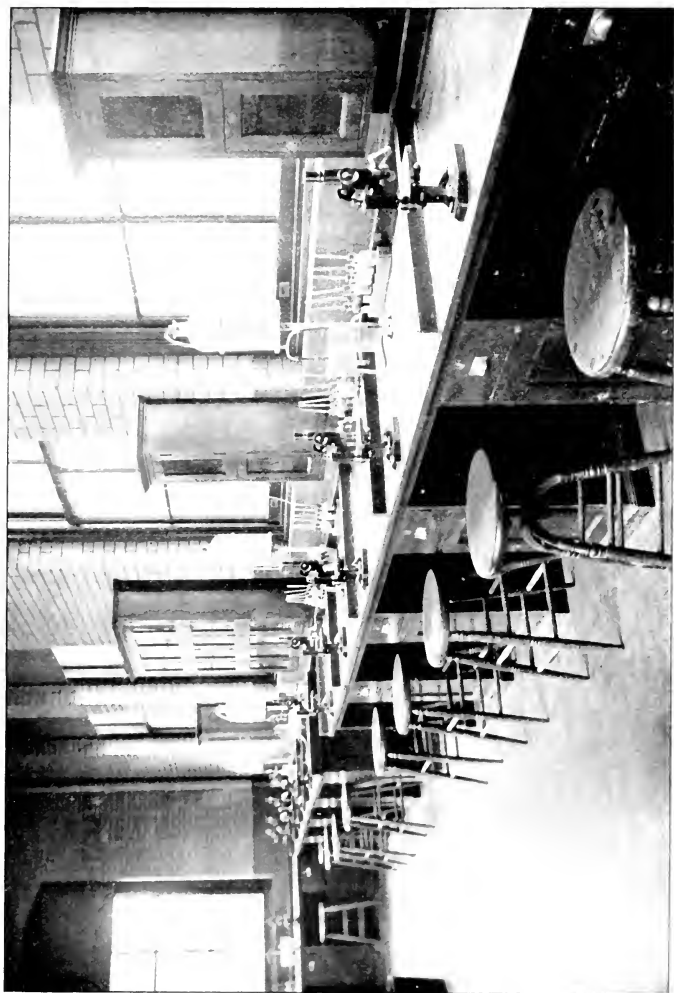


Fig. 5.—Closer view of a group of desks for microscopic work; showing general relations to one another, the position of desk-lockers, and of lockers on the walls for microscopes.



PROCEEDINGS OF THE CORPORATION.

At a stated meeting held on February 5, 1900, the following business was transacted :

Drs. James Tyson, J. William White and Barton C. Hirst were duly elected managers of the University Hospital as representatives of the Medical Faculty. The degree of Doctor of Laws *honoris causa* was voted to Professor James Barr Ames, of Harvard University ; Sir Charles Arthur Roe, of Oxford University ; Gerard Brown Finch, Esq., of Cambridge University ; Mr. Justice John Marshall Harlan, Senior Associate Justice of the Supreme Court of the United States ; Hon. Oscar S. Straus, United States Minister to Turkey ; and to His Excellency Wu Ting-fang, Chinese Minister to the United States. The Provost presented his published report for the year ending August 31, 1899. Thanks were voted to donors of funds ; to Clayton McElroy, Esq., for his gift of papers belonging to the late Professor John G. R. McElroy ; and to the West Philadelphia Medical Club, for the gift of its library. The Rev. Dr. George Dana Boardman was elected Lecturer in Christian Ethics for the year 1901, on the Boardman Foundation. Consent was given to the deposit of the Brinton Library, as a part of the University Library, in the Free Museum of Science and Art.

At a stated meeting held on March 6, 1900, the following business was transacted :

The resignation of Dr. John Ashhurst, Jr., as John Rhea Barton Professor of Surgery, was accepted with expressions of deep regret, and warm appreciation of his valuable services for twenty-three years. Acknowledgment was made of the following gifts : to C. B. Lamborn, Esq., for books and antiques belonging to the late Dr. Robert H. Lamborn ; to Uselma C. Smith, Esq., for a copy of Dr. John Morgan's appeal for funds in 1772 ; to the University of Cambridge,

for a bronze medal commemorative of the George Gabriel Stokes Jubilee Anniversary ; to Dr. S. Weir Mitchell, Col. J. Cassells, Dr. Hobart A. Hare, Messrs. A. G. Spencer, W. S. Sanderson, P. Blakiston's Son & Company, Robert C. H. Brock and Minneapolis Board of Trade, for books. A revised set of regulations governing the Department of Archæology and Paleontology was adopted. Consent was voted for the loan of the "Diccionario de Motul" MSS. (from the Brinton Library) to the Bureau of American Ethnology, for publication. With the consent of the donors, the title of the Law Library was ordered changed to "The Biddle Law Library," the several names to be commemorated by the erection of a tablet, suitably inscribed. A graduate course in law, leading to the degree of Master of Laws (LL. M.), was authorized, instruction to begin with the next academic year. The thanks of the Corporation were voted to all those who participated in the ceremonies incident respectively to the dedication of the War Memorial Tower, the opening of the new Law School Building, and the celebration of "University Day" on February 22.

At a stated meeting, held on April 3, 1900, the following business was transacted:

An Assistant Prosectorship to the Chair of Anatomy was created. The establishment was ordered, in the Philosophical Faculty, of a new group committee, to be known by the title of Political Science and Jurisprudence. It was decided to reorganize the teaching of Surgery, on the basis of a Professorship of Surgery, and two Professorships of Clinical Surgery. Thanks were voted to donors of funds and gifts, the latter including: by Professor Hampton L. Carson, of an oil portrait of James Wilson, the first Professor of Law in the University, painted by Albert Rosenthal from a miniature owned by Thomas H.

Montgomery, Esq.; and also a framed collection of engraved portraits of Benjamin Franklin; by Mr. Rafael Estrada, of a unique and valuable specimen of Galenite; by the Warden of Merton College, Oxford, through Sir Charles Arthur Roe, of a collection of facsimile MSS.

The following appointments and reappointments to Fellowships and Scholarships were confirmed:

HARRISON FELLOWSHIPS.

Semitic Languages—Walker Moore Levett, A. B. (Pennsylvania, 1893).

Classical Languages—Nicolaos Panagis Vlachos (Gymnasium of Haarlem, 1895).

Germanic Languages—Georg Martin Richter, Graduate of Koeniglicher Gymnasium, Dresden, 1897.

Romanic Languages—Daniel Ernest Martell, A. B. (Pennsylvania, 1898).

English—John Louis Haney, B. S. (Pennsylvania, 1898).

Pedagogy—Ira Bennett McNeal, A. B. (Dickinson, 1898).

American History—Frederic Logan Paxson, B. S. (Pennsylvania, 1898).

European History—William Ezra Lingelbach, A. B. (Toronto, 1894).

Economics—Roswell Cheney McCrea, A. B. (Haverford, 1897).

Political Science—Leonard Anderson Blue, Ph. B. (Cornell, 1892).

Mathematics—Ulysses Sherman Hanna, A. B., A. M. (Indiana, 1895, 1897).

Biology—Henry Shoemaker Conard, B. S., A. M. (Haverford, 1894, 1895).

HARRISON FELLOWSHIPS-AT-LARGE.

English—Morris William Croll, A. B., A. M. (Harvard, 1894, 1895).

Chemistry—Gilbert Hillhouse Boggs, B. S. (University of Georgia, 1896).

Zoölogy—John Raymond Murlin, B. S. (Ohio Wesleyan, 1897).

ALUMNÆ FELLOWSHIP FOR WOMEN.

Mathematics—Miss Roxana Hayward Vivian, A. B. (Wellesley, 1894).

BENNETT FELLOWSHIPS.

Classical Languages—Miss Jessie Pell Brown, A. B. (Toronto, 1897).

American History—Miss Lolabel House, A. B. (Nashville, 1893); A. M. (Chicago, 1898).

BLOOMFIELD MOORE FELLOWSHIPS.

Zoölogy—Miss Caroline Burling Thompson, B. S. in Biology (Pennsylvania, 1898).

European History—Miss Caroline Colvin, A. B. (Indiana, 1893).

PEPPER FELLOWSHIP.

Sociology—Miss Charlotte Kimball, B. S. (St. Lawrence, 1892).

COLLEGE REGISTRATION STATISTICS.

The following statistics covering the six years from 1894-95 to 1899-1900 relate to students in The College, omitting students registered in the Courses for Teachers.

	1894-95	1895-96	1896-97	1897-98	1898-99	1899-1900
Number of Students from Philadelphia	449	443	410	419	434	455
Pennsylvania (outside of Philadelphia)	123	139	121	136	118	134
Other States	104	99	93	87	90	107
Foreign Countries	13	9	11	12	7	10
	689	690	635	654	649	706

	1894-95	1895-96	1896-97	1897-98	1898-99	1899-1900
Percentage of Students from						
Philadelphia	65.2	64.2	64.6	64.1	66.8	64.4
Pennsylvania (outside of Philadelphia)	17.8	20.1	19.1	20.8	18.2	19.0
Other States	15.1	14.4	14.6	13.3	13.9	15.2
Foreign Countries	1.9	1.3	1.7	1.8	1.1	1.4
	100.0	100.0	100.0	100.0	100.0	100.0

STATES AND TERRITORIES REPRESENTED.

	1894-95	1895-96	1896-97	1897-98	1898-99	1899-1900
New Jersey	33	26	26	28	32	33
New York	11	16	14	13	8	14
Delaware	15	12	15	7	9	10
Ohio	3	7	6	7	5	9
Maryland	5	2	3	2	5	5
Massachusetts	2	3	0	2	6	9
Illinois	4	2	3	3	3	6
Missouri	2	5	3	2	5	4
Wisconsin	5	4	2	1	1	1
District of Columbia	4	5	1	2	1	1
Virginia	1	1	2	3	4	0
Michigan	3	3	1	1	0	2
Colorado	2	2	1	0	1	2
North Carolina	1	1	1	3	1	1
Indiana	4	3	0	0	0	0
Iowa	1	0	0	1	2	2
Kentucky	1	0	0	1	2	2
West Virginia	2	2	1	0	0	0
Texas	1	1	2	1	0	0
Washington	1	1	2	1	0	0
Connecticut	0	0	0	1	2	2
Tennessee	0	1	1	1	1	0
Kansas	0	0	2	1	1	0
Rhode Island	0	0	1	2	1	0
Minnesota	1	0	0	1	1	0
California	0	0	1	0	0	2
South Carolina	1	1	0	0	0	0
Alabama	0	1	1	0	0	0
Montana	0	0	1	1	0	0
Florida	1	0	0	0	0	0
South Dakota	0	0	1	0	0	0
Alaska	0	0	1	0	0	0
New Mexico	0	0	0	1	0	0
Vermont	0	0	0	0	1	0
Georgia	0	0	0	0	0	1
Louisiana	0	0	0	0	0	1
	104	99	93	87	90	107
Number of States Represented	23	21	25	24	20	19

FOREIGN COUNTRIES REPRESENTED AND NUMBER OF
STUDENTS EACH YEAR.

	1894-95	1895-96	1896-97	1897-98	1898-99	1899-1900
Russia	4	5	4	1	0	1
Japan	2	2	3	3	2	2
Cuba	2	0	0	2	1	1
Canada	1	0	1	1	1	1
England	1	0	1	1	0	0
Argentine Republic	0	0	1	1	1	0
India	0	0	1	2	0	0
Costa Rica	0	0	0	0	1	2
Ireland	1	1	0	0	0	0
Leeward Islands	0	0	0	0	1	1
Mexico	0	0	0	0	0	2
Nicaragua	1	0	0	0	0	0
Palestine	1	0	0	0	0	0
Spain	0	1	0	0	0	0
Germany	0	0	0	1	0	0
	13	9	11	12	7	10
Number of Foreign Countries Represented	8	4	6	8	6	7

SPACE-ANALYSIS.

[Brief of Twelve Lectures on the GEORGE LEIB HARRISON FOUNDATION by ALEXANDER MACFARLANE, D. Sc., LL. D., Lecturer on Mathematical Physics at Lehigh University. Delivered in College Hall, February 5 to March 2, 1900.*]

By space-analysis is meant the analysis which is founded on the properties of space. In form it is a generalization of algebra, and is distinguished from it by providing an explicit notation for direction.

At the present time the cultivators of space-analysis are divided into two schools—quaternionists and vector-analysts: the opening lecture was devoted to a consideration of the points in dispute. Vector-analysts maintain that the fundamental quantity in space-analysis is the vector; quaternionists that it is the quaternion. The lecturer maintained that both ideas are fundamental, and cannot be replaced the one by the other.

* To promote the study and development of Space-Analysis, there has been founded recently an International Association, of which Dr. A. Macfarlane is General Secretary.

According to the vector-analysts the square of a vector is positive; according to the quaternionists, it is negative. The lecturer maintained that there are imaginary vectors as well as real vectors, and that the square of the former is negative, whereas that of the latter is positive. The analysis of the quaternionists leads to products which are associative, although not commutative: the analysis of the vector-analysts leads to products which are neither commutative nor associative. The lecturer maintained that in this respect the quaternionic analysis corresponds to geometry and trigonometry, while vector-analysis, as commonly taught, does not, and as a consequence it remains dwarfed in its development. As regards the relation of space-analysis to the Cartesian geometry and to the algebra of the complex quantity, the lecturer maintained that it can be presented so as to be in perfect logical harmony with both; it stands towards them as a logical whole towards its parts.

Vectors may be denoted by italic capitals as A, B, C ; their magnitudes by the corresponding small letters a, b, c , and their axes by the corresponding Greek letters α, β, γ . This notation, it was pointed out, is spherical in its nature, for the axes α, β, γ are all of unit length. In the course of its development the analysis leads to hyperboloidal and ellipsoidal axes, which are not of unit length.

As regards the addition of vectors, the lecturer drew a distinction between the addition of vectors which have a common point of application, and vectors which have a real succession. If the former are represented by the sides of a polygon, their resultant is merely the vector from the initial point to the final point; in the latter case, where there is a real succession of the sides, the resultant is not so simple, and the area of the polygon has a meaning. These successive vectors appear as the logarithms of angles, that is, of versors.

The fundamental rules of the Quaternion analysis, as given by Hamilton and Tait, are:

$$\begin{array}{lll} i^2 = -1 & j^2 = -1 & k^2 = -1 \\ ij = k & jk = i & ki = j \\ ji = -k & kj = -i & ik = -j. \end{array}$$

The fundamental rules of vector-analysis, as used by Heaviside and Gibbs, are:

$$\begin{array}{lll} i^2 = +1 & j^2 = +1 & k^2 = +1 \\ ij = k & jk = i & ki = j \\ ji = -k & kj = -i & ik = -j. \end{array}$$

The lecturer showed that the vector rules can be made associative, by introducing $\sqrt{-1}$ in the last six, giving

$$\begin{array}{lll} i^2 = +1 & j^2 = +1 & k^2 = +1 \\ ij = 1 - \sqrt{-1} k & jk = \sqrt{-1} i & ki = \sqrt{-1} j \\ ji = -\sqrt{-1} k & kj = -\sqrt{-1} i & ik = -\sqrt{-1} j. \end{array}$$

He next showed that the quaternion rules involve an order from right to left, opposite to the natural order of writing, and that when the natural order is followed, they become

$$\begin{array}{lll} i^2 = -1 & j^2 = -1 & k^2 = -1 \\ ij = -k & jk = -i & ki = -j \\ ji = k & kj = i & ik = j. \end{array}$$

The ij jk of Hamilton are in fact imaginary axes, equivalent to $1 - \sqrt{-1} i$, $1 - \sqrt{-1} j$, $\sqrt{-1} k$, where i j k denote real axes. Consequently the above set of rules reduce to

$$\begin{aligned} (1 - \sqrt{-1} i) (1 - \sqrt{-1} j) &= -1 & (1 - \sqrt{-1} j) (\sqrt{-1} j) &= -1 \\ (1 - \sqrt{-1} k) (\sqrt{-1} k) &= -1 \\ (1 - \sqrt{-1} i) (\sqrt{-1} j) &= -1 - \sqrt{-1} k & (\sqrt{-1} j) (\sqrt{-1} k) \\ &= -\sqrt{-1} i & (1 - \sqrt{-1} k) (\sqrt{-1} i) &= -\sqrt{-1} j \\ (1 - \sqrt{-1} j) (\sqrt{-1} i) &= 1 - \sqrt{-1} k & (1 - \sqrt{-1} k) (\sqrt{-1} j) \\ &= \sqrt{-1} i & (1 - \sqrt{-1} i) (1 - \sqrt{-1} k) &= 1 - \sqrt{-1} j. \end{aligned}$$

And these are in perfect harmony with the corrected rules for vectors. The former are plain vectors, and are hyperbolic in their nature: the latter are imaginary vectors, and are circular in their nature. The subsequent developments contained in the lectures were based on these two sets of fundamental rules, which are complementary to one another.

For any two real axes α and β ,

$$\alpha\beta = \cos \alpha\beta + 1 \sqrt{-1} \sin \alpha\beta . \alpha_i\beta,$$

where $\alpha_i\beta$ may be defined in a preliminary manner as the axis perpendicular to the plane of α and β , but is more accurately defined as the conjugate axis to the plane of α and β . Hence $ij = k$ means that k is the conjugate axis to the plane of i and j . For any two imaginary axes

$$(1 \sqrt{-1} \alpha) (1 \sqrt{-1} \beta) = -\cos \alpha\beta - 1 \sqrt{-1} \sin \alpha\beta . \alpha_i\beta.$$

For any three real axes, α, β, γ ,

$$\begin{aligned} \alpha_i\beta\gamma &= \cos \beta\gamma . \alpha - \cos \gamma\alpha . \beta + \cos \alpha\beta . \gamma \\ &+ 1 \sqrt{-1} \sin \alpha\beta \cos \alpha_i\beta\gamma. \end{aligned}$$

For any three imaginary axes

$$\begin{aligned} (1 \sqrt{-1} \alpha) (1 \sqrt{-1} \beta) (1 \sqrt{-1} \gamma) &= -1 \sqrt{-1} \{ \cos \beta\gamma . \alpha \\ &- \cos \gamma\alpha . \beta + \cos \alpha\beta . \gamma \} + \sin \alpha\beta \cos \alpha_i\beta\gamma. \end{aligned}$$

The signs $+$, $-$, $+1 \sqrt{-1}$, $-1 \sqrt{-1}$ are signs of affection, and are scalar in their nature. Let $\frac{\pi}{2}$ denote any spherical axis, then

$$\begin{aligned} + &= \frac{\pi}{2} 2r\pi & - &= \frac{\pi}{2} (2r-1)\pi \\ +1 \sqrt{-1} &= \frac{\pi}{2} (2r+\frac{1}{2})\pi & -1 \sqrt{-1} &= \frac{\pi}{2} (2r+\frac{1}{2})\pi \end{aligned}$$

where $r=0, 1, 2, 3$, etc.

There are circular complex quantities, and hyperbolic complex quantities; circular angles and hyperbolic angles; circular quaternions and hyperbolic quaternions. Let γ denote the axis of a plane; then a circular angle of magnitude ϵ and axis γ is expressed by $e^{e\gamma} = 1\gamma$, and a circular quaternion of modulus r and the above angle or versor is expressed by $re^{e\gamma} = 1\gamma$. The circular complex quantity for the plane γ is expressed by $a + b 1 \sqrt{-1} \gamma$ and the connection between the quaternion and the complex quantity is given by

$$r = 1 \sqrt{a^2 + b^2} \quad \tan \epsilon = \frac{b}{a}.$$

Similarly, a hyperbolic angle is expressed by $e^{c \cdot \gamma}$; and if r denote the hyperbolic modulus, the hyperbolic quaternion is expressed by $re^{c \cdot \gamma}$. The hyperbolic complex quantity for the plane γ is expressed by $a + b \cdot \gamma$; and we have the relations

$$r = \sqrt{a^2 - b^2} \quad \tanh c = \frac{b}{a}.$$

A complex angle is the sum of a circular angle and a hyperbolic angle: it is circular in its nature when the first angle is circular, and hyperbolic in its nature when the first angle is hyperbolic. The cosine and the sine of a complex angle of the first kind may be defined analogously to the cosine and sine of a circular angle; and the cosh and sinh of a complex angle of the second kind analogously to the cosh and sinh of a hyperbolic angle. The cosine and sine or the cosh and sinh of a complex angle are scalar complex quantities of the form $a + \sqrt{-1} b$, the absence of a definite axis indicating that the quantity, although complex, is scalar. The theory was applied to the imaginary intersections of a circle with a straight line, and an equilateral hyperbola with a straight line.

The fundamental theorem of spherical trigonometry expresses the cosine of the third side in terms of the other two sides and their included angle. Space-analysis gives directly the product of two sides of the triangle, and this product (which is commonly called the sum) is equivalent to the third side of the triangle taken the other way round; it gives not only the cosine but the directed sine. Let $e^{b\sqrt{-1}\beta}$ and $e^{c\sqrt{-1}\gamma}$ denote the two sides, then

$$e^{b\sqrt{-1}\beta} e^{c\sqrt{-1}\gamma} = \cos b \cos c - \sin b \sin c \cos \beta\gamma \quad \dots \quad (1)$$

$$+ \sqrt{-1} \{ \cos c \sin b \cdot \beta + \cos b \sin c \cdot \gamma - \sin b \sin c \sin \beta\gamma \cdot \overline{\beta\gamma} \} \quad (2)$$

The modulus of (2) is the sine of the third side, and its direction is that of the conjugate axis to the plane of the initial line of the first angle and the final line of the second angle. It was shown how to deduce the polar theorem and the sine theorem for the sphere, and how to find the spherical generalizations of the sum and difference theorems of plane trigonometry.

The next subject taken up was the theory of exponentials and logarithms in space-analysis. Hamilton concluded that

$$e^{b\mathbf{1} - \mathbf{1}\beta} e^{c\mathbf{1} - \mathbf{1}\gamma} \text{ is not } e^{b\mathbf{1} - \mathbf{1}\beta + c\mathbf{1} - \mathbf{1}\gamma};$$

because the expression on the left hand gives for the term of the second order

$$\frac{1}{2}\{ -b^2 - c^2 - 2bc\beta\gamma \}$$

whereas $b\mathbf{1} - \mathbf{1}\beta + c\mathbf{1} - \mathbf{1}\gamma$ being, as he assumed, the sum of two vectors, its square is

$$-b^2 - c^2 - 2bc \cos \beta\gamma.$$

But $b\mathbf{1} - \mathbf{1}\beta + c\mathbf{1} - \mathbf{1}\gamma$ is not the sum of common vectors; it is the sum of two successive vectors, and their order of succession cannot be changed any more than the order of the factors of which they are the logarithms. Hamilton's mode of forming the square violates this order, for one cross term is in $\beta\gamma$, the other in $\gamma\beta$, which has the effect of cancelling out the term in $\sin \beta\gamma$. The true square is

$$-b^2 - c^2 - 2bc\beta\gamma,$$

which is identical with the expression given by the product on the left hand. It follows that the powers of a sum of two or more vector logarithms are similar to those of a sum of two or more scalar quantities, provided that the order of the axes is preserved in each term. It also follows that the index $b\mathbf{1} - \mathbf{1}\beta + c\mathbf{1} - \mathbf{1}\gamma = b\mathbf{1} - \mathbf{1}\beta$ does not reduce to $c\mathbf{1} - \mathbf{1}\gamma$, which it would do, if it were a sum of non-successive vectors. From the generalization of the exponential theorem, the generalizations of the binomial, multinomial and logarithmic theorems were deduced.

The next subject taken up was trigonometry on the surface of the equilateral hyperboloid. Let a denote the axis of revolution; β and γ unit axes perpendicular to it; then $e^{b\beta}$ and e^γ are hyperbolic angles passing through the axis of revolution. The product is

$$e^{b\beta} e^\gamma = \cosh b \cosh c + \sinh b \sinh c \cos \beta\gamma \quad . \quad . \quad . \quad (1)$$

$$+ \cosh c \sinh b \cdot \beta + \cosh b \sinh c \cdot \gamma \\ + \mathbf{1} - \mathbf{1} \sinh b \sinh c \sin \beta\gamma \cdot a \quad . \quad . \quad . \quad (2)$$

The third side so determined is the intersection of the equilateral hyperboloid of two sheets with the central plane through the initial point of the first angle and the final point of the second angle. The modulus of (2) is the sinh of the third side, and its axis is the conjugate axis to the plane of the third side.

The general spherical versor is expressed by $e^{a\sqrt{-1}\xi}$, where $\xi = \cos \theta . \varepsilon - \sin \theta . a$, a being the axis of revolution and ε a unit axis perpendicular to it. Similarly the general versor for the equilateral hyperboloid of two sheets is $e^{a\xi}$, where $\xi = \cosh \varphi . \varepsilon + \sqrt{-1} \sinh \varphi . a$. This axis ξ is a vector to the equilateral hyperboloid of one sheet. In the case of a versor for the equilateral hyperboloid of one sheet, the axis ξ may have the form $\cosh \varphi . \varepsilon + \sqrt{-1} \sinh \varphi . a$, in which case the section is hyperbolic; or it may have the form $\cosh \varphi . a + \sqrt{-1} \sinh \varphi . \varepsilon$, in which case the section is elliptic. A general triangle on each surface was investigated.

In the case of the sphere the general axis has the form $\xi = \cos \theta . \varepsilon - \sin \theta . a$. For the ellipsoid of revolution, this becomes $\xi = \cos \theta . k\varepsilon - \sin \theta . a$, where k denotes the ratio of change of the perpendicular axes. For the general ellipsoid $\xi = \cos \theta (k \cos \varphi . \beta + k' \sin \varphi . \gamma) - \sin \theta . a$, where β, γ, a are the three principal axes.

It was shown that in all of these cases $\xi^2 = 1$, and also how to form $\xi\eta$, when ξ and η are general axes of any of these types. It was also shown that in every case

$$e^{a\xi} e^{b\eta} = e^{a\xi + b\eta}.$$

PRIMITIVE AMERICAN ART.

Stewart Culin.

[Delivered before the Biological Club, January 8, 1900.]

In discussing primitive art from the conventional and customary standpoint, it is usual to refer to an early savage stage, in which the artistic instincts were entirely undeveloped; to illustrate by means of rudely chipped stones a period when man was just emerging from fellowship with the higher apes; and then to trace the gradual evolution of the æsthetic sense, as greater technical skill and increasing appreciation of form and color led him at last to the perfection of Greece or the sublimity of Egypt. The assumption is one that invariably passes unchallenged, but in point of fact we have little or no *objective* evidence of such an orderly progress among the American tribes. I am entirely unable (with all the resources of our great museums at my command) to discover satisfactory proofs of any considerable change in the character of the culture or the capacity of the race. Nothing that would justify a classification of paleolithic and neolithic man in America, or enable us to arrange in chronological sequence the remains that lie scattered over every hillside in our land.

Deprived, then, of the philosophic pleasure of assigning dates or reconstructing dynasties, the sane and conscientious student of American antiquities finds recompense in the light afforded by the antiquities themselves; in the new methods of study; and in the new theories of origins that are forced upon him as he traces, step by step, the logical development of our native institutions.

In any general survey of the American race, considering both its prehistoric remains as well as its surviving tribes, one is impressed with the fundamental truth laid down by my late master, the lamented Brinton, that it is practically homogeneous; and that, despite their many divergent languages, the aboriginal inhabitants of this country, past and present, have

* This lecture, which was illustrated with specimens from the Free Museum of Science and Art of the University of Pennsylvania, was not written with a view to publication. The writer desires to make a comprehensive acknowledgment to Mr. Frank Hamilton Cushing for the fundamental ideas contained therein.

similar traditions, common modes of thought, and a symbolism practically identical in its expression. We are therefore enabled to understand the people of a remote stone age, more remote than the Pyramids or that mound of Nippur, through the oral explanations of its surviving members.

These facts, the lack of any chronology, and the homogeneous character of the culture, premised, I proceed directly to my theme of primitive art.

Should one characterize the art of the Amerind in a word, it would be as *grotesque*. Man, beast and bird are represented, not always unskillfully, but ever with such a curious disregard of actual form and expression that it would seem some perversity of temper or intellect dominated the race; that the sense of beauty was absent; and that we saw here reflected a character either debased by superstition or unenlightened by any of the nobler sentiments of humanity. An explanation of this fundamental difference between aboriginal art, and art as we cultivate and understand it, involves not only the definition of art itself, but further, an explication of the mental processes of man in the stage which, as a matter of convenience, we call primitive. I shall not directly attempt this difficult task, but instead shall illustrate by actual examples the origin and development of certain typical forms, chiefly referring to the human figure. I must first state, however, that the basis of savage art is not æsthetic, but symbolic;—that the ornamental patterns, often repeated in pleasing designs, are always full of meaning; and even where this is forgotten, they are still employed because of traditional potency; that the color harmonies, subtle and elusive, are governed not by commingled taste and fancy, but by the requirements of an inflexible ritual; and that the sculptured form, though wrought in the semblance of a man, embodies the concept of an elemental power.

It is a common notion that our savage is near akin to a child. This true, his art might indeed have been the outgrowth of rude scribbings; but primitive man—savage man—master individually of all the tribal arts, the personal conservator of all the wisdom and experience of mankind, re-creating the world anew each year by his rites and thus saving it from darkness and oblivion—was childlike only in that egotism which

centred the world in himself, and fancied his dwelling the navel of the universe. All nature to him was animated by a life akin to his own. The beasts of the forest were his blood relations; the trees, and even the rocks and stones, were endowed with a personality; nay—even the products of his handicraft became alive and invested with a potentiality of good and ill. The control of these omnipresent forces was supposedly secured by processes of sympathetic magic. Evil influences were averted and protection and fertility insured by dramatic dances, in which the auspicious influences were aided and encouraged, and the bad repelled. A jagged mark on the arrow, simulating the lightning, gave it the force and directness of the celestial bolt. This tooth—the tooth of a mountain lion—bound to the stick with which the arrow was thrown, imparted the tiger's energy to the lethal dart. The form and decoration of the food-bowl contributed to insure its constant replenishment. The art which arose out of such magical practices was naturally symbolic. Thus, for a bear, we have the print of his extended paw. For man himself, not the figure of a man directly, but usually one of two or three highly significant objects, which, first employed in their actual practical forms, were in time more and more conventionalized; and, slowly simulating the figure of the being they stood for, at last assumed the attributes of humanity.

The American Indian generally, at the time of discovery, was a migratory hunter. While, in Mexico and Peru he had built towns and cities, and, here and there, had become a settled agriculturist, planting corn and pumpkins, and even, as in Peru, domesticating the llama; yet, in general, he lived by the chase. He was a warrior, too: his tribal organization a federation of warriors. Both as hunter and warrior his chief offensive weapon was the arrow. This implement we find almost invariably marked to distinguish its ownership. The marked arrow designated the quarry, whether of war or the chase. His arrow, stuck in the prairie, identified the resting place of a fallen chief. In the estufa of the cult society, the arrow of an absent member stood in his place before the altar in the tribal ceremonies. The principal marks of identification were placed upon the shaftment (the part bearing the feather,

next the bow); and we discover not only actual arrows, but this marked part alone, used as the symbol of a man. A bundle of these shaftments, each with its peculiar mark, thus came to represent the men of a particular war society, or all the warriors of a tribe or clan. In the tribal games, the contests were not only between the warriors themselves, but were waged with the warriors' weapons. These sticks which I exhibit, conventionalized shaftments of arrows, are the playing cards of one of the tribes of our Northwest coast. Again, among the representations of the gods upon the altars of the cult societies of our Pueblo Indians, are carved slats and wooden billets—both descendants of arrows which they have replaced. It may be interesting to learn the process by which I arrived at this conclusion.

A common—indeed, almost universal—American game is one in which a stick or stone is concealed under one of four differently marked arrow-derived tubes, the opposing side guessing under which it is hidden. In its elementary form the game is played with four marked canes or reeds. In the second form which I exhibit the cane is replaced by wooden tubes, distinguished, like the canes, by bands or ribbons. At the next step the bands disappear, and are succeeded by rude symbols of the gods of the four World Quarters. Finally, we have effigies of the gods themselves, corresponding both in name and form with those upon the tribal altars. These rudely carved billets are not to be considered as the direct attempts to represent the human figure, but rather as slow approximations from the practical arrow.

Everywhere essential to man's first steps along the path to civilization is that other all-important implement, used symbolically for a man, the stone axe. Like the arrow-head, the stone axe is found strewn over the length and breadth of the earth. It is to a peculiarly beautiful and luminous illustration of its use as the emblem of man's power I desire to direct your attention. There are two principal forms of the stone axe, one with a groove for hafting, practically confined to North America; the other, smooth and often highly polished, common to almost the entire world. These polished axes (or celts, as they are designated) are from a prehistoric cemetery at Nicoya, in

Costa Rica. With them were found great treasures of jade and greenstone ornaments, gold images and other personal adornments. A majority of these carved stones are slices of pebbles, cut to simulate the practical axe, yet intended, as we know from analogy, as the ceremonial badge of the warrior. These imitation axes have, in some instances, carved upon them the marks of hafting cords, thus identifying them more closely with, and giving them the substance and principle of, the real axe they stood for. Examining these simulated cord marks we perceive that, heightened and modified, they are used to convert the axe into the image of a man, with his hands folded across his chest. In some merely suggested, in others more pronounced, we trace this axe-figure until it reaches the stage of an image with head-dress, and legs cleft apart. Plated with gold, it yields this small image, which owes its peculiarities to its ancestor the axe: nor is this ancestry ever lost sight of. And thus to the end of the series we find a grotesque and unnatural element, which can only be explained by careful comparative analysis. Our axe-man (or axe-god) gives us a clue to the origin and meaning of some of the larger images. This figure* is none other, and the great monolithic statues of Tiahuanaco, in Bolivia—remains that take their place with the walls of Balbeck and the Pyramids of Egypt—are doubtless also of similar derivation.

From man, the warrior, let us turn for a moment to woman, the mother and producer. This series of pottery vessels from the mounds of Missouri (modeled originally in imitation of the gourd) are seen to take on the face and figure of a pregnant woman, with whom the natural gourd is considered analogous.

Generally speaking, we find no attempt in America at anything like portraiture. From the identity of the exploits of the tribal heroes in the myths we conclude that these personages must be regarded, not as individuals, but rather as the personification of cosmical phenomena. In the same way the images and pictures should be considered, not as likenesses, but as embodying the attributes of these legendary heroes.

Very slight observation impresses one with the fact that the representations of animals in American art are more faithful

* A large green stone image from Mexico.

and truer to nature than those of human beings. While man is depicted with animal head and limbs, or rather, while the lower creatures are frequently given human bodies and assimilated in form to man, we also find the dominant beasts and birds copied directly from nature with amazing truth and fidelity. Their magical and vital power was something innate; an essence which man himself sought to borrow when he assumed their form in his masked dances, and thereby identified himself with the divine wisdom and strength supposed to reside in and emanate from these strange and mysterious creatures,—higher than man, midway between him and the gods, who were formed like them. But the animals are not always drawn from nature. We find them conventionalized past recognition save for beak or snout, teeth, claws, scales or tail; or again, so split and divided and wrought around and over some implement, utensil or weapon, to which it is desired to impart their personality, that only at the present moment, through the studies of Holmes, Cushing and Boas, have we come to recognize the meaning of what have hitherto been looked upon as the vagaries of an uninformed and unsystematized imagination.

And here I must leave the subject of form in American art. Color—equally strange in its application, following rules based upon the same system of reasoning, always significant and magical—I must also pass over, to say a few words in conclusion upon the value of our American studies in throwing light upon the problems of old world culture, as aids in the solution of the great riddle of humanity.

Man's beginnings were infinitely complex. His art is the product not only of the environment with which economists deal, but also of the interactions of that environment, and man's intellectual nature. The mental processes of man in America are precisely the same as those of man in Europe; and what we find existing to-day in America underlies all the higher civilization of the other continents.

ABSTRACTS OF RECENT PAPERS.**The Voluntary Element in Changes in Language.**

MORTON W. EASTON.

(Read before the Language Union, February 15, 1900.)

The paper discussed the manner and the degree in which the conscious voluntary activity of the individual may be conceived to take part in the introduction of new meanings, or new phonetic forms, as permanent characteristics of a language; and to what extent it is possible to trace the same individual voluntary activity even in the first manifestation of most modifications in either field.

Most changes in meaning, like most mechanical contrivances, are clearly due to the conscious will.

I say "mechanical contrivances" rather than machines, since the latter word suggests a more intense conscious activity than that present in the greater number of instances of the invention of a new appellation. I have in mind rather such adaptations as the curve of a scythe-blade, or of the handle of a table-fork. When the neolithic man, in order to do a particular piece of work, altered the angle of his flint axe to the stick to which he had tied it, he probably did not devote any great degree of mental concentration to the matter; still less can we suppose that he foresaw the final evolution of the adze or the hoe: nevertheless we do not doubt that the alteration in the tool was a conscious and a voluntary act.

We might perhaps leave to the metaphysicians to discover the mental mechanism leading him to hit on the notion of some improvements of the sort: many of them would result from deliberate experimentation to meet a clearly conceived end. It is with the design displayed in their adoption by him and by other individuals that we are mainly concerned.

In very many cases of names-giving, and of the contraction or the expansion of the meaning of old words, the voluntary character of the process is too clear to need discussion. It is not, however, so easily detected in many instances in which a thing is named from some quality possessed by the thing, especially when the quality has always been apparent to every observer, even before the name is given; such a process, for instance, as that involved in giving the name "shining one," or "shiner," to a particular animal or a particular planet.

If the quality in question is shared by other objects, the first individual to use the term must have consciously so shaped his sentence, or adapted his gestures as to make his meaning clear. Of this necessity we are all conscious whenever we resort to similar means of indicating an object whose name we do not know. It is a very frequent experience.

If the quality is one not shared by other objects, the degree of conscious purpose involved may be very small. Such cases are necessarily rare. But even in these we must exercise conscious abstraction in singling out

the quality to serve as a name for the whole. A certain nameless stream may be the only broad watercourse in my horizon, but in speaking of it as "the broad river," I am fully aware that I am endeavoring to make up for a deficiency in my vocabulary, and the process is certainly no less a conscious one if the word "river" is dropped from the phrase.

Even more difficult, perhaps, are those cases in which words seem to change their meaning with a change in the conditions of the people. Of these changes there are many kinds, depending mainly on the rapidity with which the change goes on. Take, for instance, the word indicating in one district "beech," and in another a certain kind of oak, the original connecting link being probably that both trees served the same purpose in the economy of the two communities. Naturally there did not prevail, in the minds of the speakers, the clear cut conceptions that we have associated with the names. This is the conscious work of Tournefort and Linnæus. We should, of course, consider not the time when the process was completed, the time when the word could not fail to call up before the mind of the people a definite picture of either one tree alone, or the other alone, and not of both, but what went on at the time of the first migration.

It is certainly hard to believe that when the first immigrant from one district entered the other there was not in his mind some reminiscence of such a sort as to cause him to recognize that there was a difference. Men do not change articles of food in such an indiscriminate way: some experiments must have been tried. The old and the new associations must, for a time, have stood alongside of each other; and except for the absence of any humorous element, the voluntary character of the process is nearly as distinct as in the case when some member of a picnicking party elects to dub a clean shingle a "plate," and a clam-shell a "spoon."

There are many possibilities in such a process and I cannot stop to enumerate them all. If the word at the time of the migration had actually no other association than with a particular use, like our word "fodder," so that it could be used with entire indifference of the product of any serviceable tree, then there was no change of meaning at all at that time. The change is of later date, and is of precisely the same character as the change already discussed in connection with the words "to shine." The conscious element is at a minimum in what might be termed secular changes of meaning.

I think that I can illustrate these best by framing a purely hypothetical example. Suppose that at the time of the retreat of the ice-sheet the people, like the modern Esquimaux, had a rich vocabulary for the various forms of ice, and in consequence a special term for "glacier."

One can understand how, as the ice melted away, this word might finally have come to be applied to the last surviving fragment on the highest slope, and so have changed its significance to that of "ice" in general. Yet it may be doubted whether such a change could go on, displacing older and more precise words, without distinct detection at every generation of speakers. Such modifications, *e. g.*, in the case of the word

"temperance" we are sure to note as they progress. Every violation of traditional usage demands, with fair degree of constancy, the reconstruction of our sentences; and this, as was said above, requires conscious attention.

I have chosen this purely hypothetical case in order to bring out very clearly the very slow manner in which such changes must operate. I should expect to find such words most frequent in the department of morals. But in comparison with the very great number of conscious and voluntary changes, and especially the innumerable host that are not perpetuated in usage, they cannot have been numerous.

We should consider the case of sheer ignorance. As a result of migration, for instance, there may arise a mistake as to the species, or even the genus, of a plant, fish or bird. Perhaps we shall get into a metaphysical tangle if we inquire closely into this class. Many instances resemble the case of the "oak" and the "beech." Many are perfectly clear cases of the adoption of a term for an unknown thing, with clear consciousness of the transfer. When the New Hampshire farmer tells me that one of our finest native orchids is a "rose" I know that he knows better, but he will certainly stick to his term and refuse to adopt mine. Nor do I believe that ignorance led Americans to transfer the terms "robin" and "daisy." If the transference was at first the result, in some cases, of indistinct observation, then the voluntary element came in later, when the particular animal, for instance, was fairly caught. It is, however, possible that there are in this class a few real exceptions.

I pass now to the consideration of changes in phonetic form. In these the detection of the part played by the will is far more difficult. In change of meaning we can see influence of definite purpose; in phonetic change, the part played by purpose is far more obscure.

Indeed, so far as concerns the absolute inception of the change of sound in the individual in whom it begins, the inception, for instance, of such a change as the transition of *tt* into *t't*, it seems difficult to maintain that the will is at work at all; just precisely as it is difficult, or impossible, to believe that the conception of a new and useful name is always due to the power of the will.

And yet, so far as concerns this particular matter, it is certain that most changes in sound are due to an attitude of the speaker toward the old sound, for which we should in other things hold the individual responsible, and which, be it remarked in passing, we should consider to be the result of the peculiar habits of the individual and not of the whole community to which he belongs. We do not charge a careless switchman with premeditated murder exactly, but we do hold him responsible for the mischief done; we acquit him if he is shown to be insane.

Phonetic changes are, in their inception, in by far the greater number of cases, due to neglect, to various forms of careless enunciation, and we can only infer that the fault lies in the general attitude of the person toward his speech. If the change is so great as to threaten the distinctness of what is said, or in any other way to impair its effect, he corrects

himself. He recognizes the fact that he is censurable, precisely as would be the case were he guilty of neglect in any other mechanical operation.

But his final adoption of the new sound, and still more its adoption by those about him, something with abundant parallels in the language history of most men—due in my own case to direct and conscious imitation of the people about me, and, be it added, only slowly and imperfectly progressive through my whole vocabulary—all this is certainly due to voluntary action. And this is a matter in which individuals differ widely: we hear constantly of old-fashioned speakers who take note of such divergencies and resist them. The records give abundant evidence of the persistence of the old forms alongside the new, which merely means that the adoption or rejection of the new sound was a matter of choice.

One is often asked if he cannot conceive of an insensible alteration in sounds, a secular change, as it were. This is certainly not unimaginable for the individual, but it is unimaginable for the community. I can imagine a geological cataclysm; this was a fertile field for the fancy of the older school of geologists, but a sounder teaching came in with Lyell, who taught us to confine ourselves to applying forces actually observable at the present day. Where, among phenomena observed at present, have we evidence of such a process?

In meanings, I have granted the possibility of a secular change, but in these only one single object is concerned; in the case of the change of a phonetic element, we have a number of independent words, and the extension of the modification so that it assumes the position of a peculiarity of the dialect, is the point under discussion.

But the element of conscious purpose in the determination of the phonetic constitution of a tongue, is best seen in the limitation set to the extent to which a tendency to change is carried, and in various exceptions to the general course of alteration, and, it may be added, in the appearance of certain words exceptional in form or derivation.

On the whole, the direction which sound change has taken in the growth of the phonetic alphabets of the daughter languages out of that of the Indo-Germanic has been towards ease of enunciation.

It is in the arrest of these tendencies at such a point as to preserve the distinctness of the words, something, as I have already said, occurring frequently to every speaker, that the element of purpose is detected. As in the moral organization of the individual man, no matter how depraved he may be, the will is always active in restraining his evil tendencies within a certain range, varying according to the reasons, good or bad, peculiar again to the individual, so that we recognize his moral responsibility for the general result; so in the growth of a speech, whatever be the tendency to decay and alteration, every speaker is careful to observe a certain rate and degree of modification. He must always, at least, adapt his speech to the comprehension of the men of his generation, and most men acknowledge other sources of restraint, such, for instance, as the artistic impulse.

In such phenomena as the rotation of the mutes, and in the almost equally remarkable displacement between the long vowels in the growth of modern English from Anglo-Saxon, the action of this purposed restraint is clearly seen. In the resulting displacements we have indeed more open and complex products in the change of *i* and *u* to diphthongal utterances, and in the rotation of *d* to *t* a surd has finally displaced a sonant. Probably it is not without significance that this was the last step in rotation.

In the process it may of course also occur that the clearness of the speech is best furthered by the admission of forms of great irregularity, such as happens when a problematic *she* appears to repair the confusion resulting from the converging into one and the same word of *hē* and *hēo*.

No individual speaker foresees the whole end, or indeed any considerable part of it; if he introduces a Norse *they*, then what he strives for is the purpose of the particular sentence now in his mouth; he struggles with the immediate difficulty as the individual pioneer does with the bit of swamp or the patch of tangle that must be cleared away before he can reap the next summer's scanty crop of grain; but in the end, the gain from the continued struggle of him and his fellows is a fair and fertile land for the whole people.

In considering the voluntary element in all varieties of change in language, we must not neglect to consider that it is one of the fine arts. To be sure, language is an instrument—nothing less and nothing more—used in communication, but there is no instrument that fails to afford room for the display of individual dexterity. I doubt if there is any instrument in whose use there is not constantly shown conscious delight in personal grace of action, and ingenuity, and, where possible, novelty in application.

Furthermore, one extremely important factor in all æsthetic matters is the love and, let me say, the necessity for variety. The old forms lose their power to impress, and, to stir the jaded energies of artist and public alike, a new form must be sought for. So far as I know the literature, no one has as yet laid sufficient emphasis on this important principle. It may lead to apparent decadence in form, although not necessarily to loss of power. I do not think that we need hesitate to affirm that even an inferior style in poetry, sculpture and architecture may, in this way, be more potent for good than a nobler, but worn out style can be. We of the present day may not perhaps be ready to assent to such a creed, for the purest work is perhaps for us the rarest.

However this may be, I think that we should seek in this principle for the impelling motive of many alterations, even in the phonetic structure. The art impulse is rarely absent to the speaker; if he lacks mental culture, perhaps he is all the more ready to obey it. In the knot of loungers on the street corner, who strive to tell a story in the most effective way, and even in the strange and unwonted oaths that they strive to invent, and in a group of academicians, however diverse and however erratic the ideal set up, the same impulse is ceaselessly active, just as the coarse

chalk sketch on the wall of a lane and the drawing of a Corot alike strive after effect. Wherever there is art of any grade, there is purpose.

This impulse is an ever-present force; it is amply able to account for the origination of much that is inexplicable in the history of the changes of sound; it brings it out of mystery into the light of daily and hourly analogies in the experience of every one. Who does not know of some cases of affected pronunciation? With us its range is narrow; our language is one that must be accepted by many and very diverse localities, but this is not true of those limited communities in which phonetic change is most rife.

I have spoken of the individual speakers, and it will perhaps seem that I have sometimes taken it for granted that most changes can originate in no other way. So far as the names-giving process is concerned, there are not probably many exceptions, relatively speaking; I have already indicated the circumstances under which exceptions may perhaps occur.

So far as concerns phonetic change the assumption of a sudden revolution on the part of an entire community has no known facts to commend it; I can form no conception of the nature of a force competent to produce such an effect; and even if I could conceive of such a force, I should require some evidence of its activity drawn from the records of experience. And, as implied above, the assumption is contrary to the abundantly certified instances of the persistence of the old sounds by the side of the new.

It seems hardly worth while to point out that the case is the same, even if it can be shown that a given change originates, at one and the same time, in the mouths of several individuals acting independently of each other. An *ā* vowel may, for instance, be permanently displaced by some shade of *ō*, by an individual living in South England and by another living in South Germany. No one doubts the entire independence of these two speakers. But the same thing would be true of the introduction of the change by two individuals in the same village street.

Nor, furthermore, does it seem necessary to point out that, just as in a complex machine, such as the steam engine, many successive inventors have contributed to perfect the whole, so in a given process in language, the work is done by a series of individuals, each adding his quota of distinctness in the determination of the meaning, or of displacement in the shifting of the phonetic element.

The paper gave much attention to the question of the possibility of variation in the direction of change within one and the same dialect.

As changes are due, in their inception, to individuals, communication and communication alone, has produced whatever degree of uniformity has been attained, and under such circumstances, we must speak, not of absolute law, but of tendencies, the tendency to uniformity in this matter acting precisely under the same limitations as is the case with those belonging to the tendency to uniformity in all other human institutions

and instruments. To the writer, a Southwestern text with an infusion of Kentish forms means a text showing the action of two "tendencies" side by side, one of which was poorly represented in the Southwest, but became the leading analogy in Kent. That a particular document contains a mixture of dialect forms is quite possible, and undoubtedly does occur, but before asserting it we must show special reason, *e. g.*, a manuscript written in one locality has been copied by a scribe from another, or an English poet has studied Scotch poetry, etc.; it does not follow as a matter of course.

The persistence of the old and the new forms, side by side, is a material consideration in the argument. If individuals differed from each other, there was no unity of phonological force in the dialect; if the variation was common to all, there was no cogency in the phonological force.

In such cases as the persistence in the South of unbroken *ald* alongside of broken *cald*, it is hard to see why the unbroken form could not have persisted until the period when the unbroken *a* could pass into a more or less open *ō*. We do not need to resort to a difference in dialect for the explanation of such forms as *old* and *cold*.

I believe that the easiest way to obtain a clear conception of the conditions connected with these questions is to try to depict to oneself what might have been the linguistic history of one single very long-lived individual man, born in primitive Teutonic times and surviving until the present day. In no essential feature could the linguistic history of such a person have differed from that of any one of us. In the experience of each one among us, every single alteration, in any department, has been attended with more or less conscious activity, if it has passed beyond the single word and into the entire vocabulary; but an immediate transformation, fatally influencing every word of our vocabulary, is unimaginable. Most of us have perhaps altered our pronunciation, but it has been word by word, and of thoroughgoing consistency there has been no question; we have felt, perhaps painfully, that it is impossible to attain it.

Furthermore, let us imagine two such persons, both born into the possession of one and the same type of speech, but afterwards coming to speak two different dialects, and consider what went on at the time when the first divergence appeared. Is there any possible way of conceiving the divergence as anything else than a divergence in one and the same dialect? Can we discover any possible reason why that which happened to these two should not also have happened to any other pair, however near to each other the latter may have lived? For an influence of environment other than through the medium of communication, on the phonetic structure of speech, has never been detected.



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COMMENCEMENT, 1900



Programme

Procession

Graduating Classes, Members of Faculties, Trustees,
Guests of the Corporation, Honorary Chaplain, Orator
of the Day, the Vice-Provost, the Provost.

Invocation Rt. Rev. OZI W. WHITAKER

University Hymn—"Our Father in Heaven"

Commencement Address WILLIAM L. PRATHER, ESQ.
President of the University of Texas.

Carmen Saeculare—"Hail ! Pennsylvania"

Conferring of Honorary Degrees

Conferring of Degrees in Course

National Anthem—"America"

Benediction

Degrees Conferred**In Course****Bachelor of Arts**

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 Stanley Folz
 Benjamin West Frazier, Jr.
 Leonard Davis Frescoln
 Alexander Grant
 John Edwin Hill
 Jacob Husik
 Alexander Ralph Kennedy

Daniel John Layton, Jr.
 William Ayer McKinney
 Charles Jastrow Mendelsohn
 Hermann Müller
 Joseph Shewell Patterson
 Alfred Belden Rice
 James Whitford Riddle, Jr.
 Harold Harrison Tryon

Bachelor of Music

William Garrett Rodgers

Elvan Lenore Vansant

Bachelor of Science

Louis Bartleson Ambler
 William James Cullen
 Edward Ziegler Davis
 William Hastings Easton
 John Henry Fager
 Wallis Woodward Fisher
 Walter Louis Fleisher
 Allison Gaw
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 William Thackara Read
 William Procter Remington
 Edward Burwell Rich
 Harry Bernard Sachs
 Allen Anders Seipt
 Kichinosuké Suto
 Wilbur Owen Sypherd
 William Purves Taylor
 Charles Ayrault Upson

Arthur Morton Wilson

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 Adam Paul Hildebeitel
 Lester Kintzing

Louis Magaziner
 William Procter Preston
 Albert Frederick Schenck

James Edgar Willing

Bachelor of Science In Biology

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 Harold Roscoe Balentine

Blanche Gardner
 Helen Taylor Higgins

Joseph England Roberts, Jr.

Bachelor of Science In Chemistry

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 George Clausen Friend
 James Gillinder, Jr.
 Joseph Engle Haines

Arthur Esler Hale
 William Bertram Imlach
 Aaron Merzbacher
 Leonard Pearce Morgan
 Burnett Smith

Herbert Spencer Turner

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Frank Eugene Hahn	Granville Lewis Taylor

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Henry Thornton Craven	Benjamin Kahn Liveright
Ninian Caldwell Cregar	Walter Biddle Saul
Adam Irving Fouse	Julius Stern
William Charles Grayson	Seizaburo Yaskawa

Bachelor of Science In Electrical Engineering

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Walter Abraham Kohn	Arthur Lowrie Reeder
Frank Eugene McKee	Arthur Linville Terry, Jr.
Stewart McCulloch Marshall	John Steele Witmer, Jr.

Bachelor of Science In Mechanical Engineering

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Henry Edward Ehlers	Samuel John Magarge, Jr.
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	Robert Aitken Workman

Mechanical Engineer

Francis Wilmer Lawrence

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Rev. Floyd Williams Tomkins

Doctor of Letters

Rev. Marcus Jastrow

Certificates*BY THE COLLEGE FACULTY:***CERTIFICATES OF PROFICIENCY****IN ARTS AND SCIENCE**

Harry Felt Liepsner

IN ARCHITECTURE

Eddy Fairchild

Ira Wilson Hoover

Herbert Godfrey Jory

Miller Isaac Kast

Arno Kolbe

William Arthur Warren

IN BIOLOGY

Norman Sinclair Betts

IN CHEMISTRY

Carlton Mathews Goodman

Joseph William Harris

Walter Horner Hart

Charles Adams Patterson

Howard Philip Ziegler

IN CIVIL ENGINEERING

George Jones Percival

IN FINANCE AND ECONOMY

Oscar Loeb

Leon Stauffer Oliver

IN INTERIOR DECORATION

George Reichenbaugh Kraber

Maree Rodes

Alfred Louis Ward

IN MUSIC

Mary Emma Bradin

Orlando Jayne Cummings

Clayton Gilbert Dixon

Anna Krewson Foulkrod

Mary Woodfield Fox

Matilda Bertha Gesing

Anna Virginia Lewis

Rebecca James Davis Noble

Frank Nathan Oglesby

Florence Mabel Paul

Grace Welsh Piper

May Porter

Annette Marcellus Slocum

Hannah Wilkins Whitehead

Edna Randolph Worrell

Honors

IN THE COLLEGE SENIOR CLASS

IN ARTS AND SCIENCE

Edward Ziegler Davis	William McClellan [Special Mention in Mathematics.]
Stanley Folz	Charles Jastrow Mendelsohn
Allison Gaw	Alfred Belden Rice
Harold Harrison Tryon	

IN FINANCE AND ECONOMY

Walter Biddle Saul

IN MECHANICAL ENGINEERING

Owen Brooke Evans	Stewart McCulloch Marshall
Frank Eugene McKee	Arthur Linville Terry

SOPHOMORE CLASS

IN ARTS AND SCIENCE

Ralph Berrell Evans	George Alvin Snook
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IN FINANCE AND ECONOMY

Albert Adam Custard	Frederick Peirce
William Schwebel	

IN MECHANICAL ENGINEERING

Paul Eckert Good	Snowden Bayard Redfield
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IN THE DEPARTMENT OF LAW THIRD YEAR

Charles Henry Howson	Thomas Cahall
Charles Louis McKeehan	Albert Nicholson Garrett

SECOND YEAR

Robert Darrah Jenks	Newton Byron Madden
Henry Wolf Bicklé	Bruce Ambrose Metzger
Lester Bicknell Johnson	John Magill Ralston
Robert Wodrow Archbald	Latimer Painter Smith
Elias Wilbur Kriebel	Walter Coggeshall Janney
Albert Charles Troutman	

FIRST YEAR

Horace Stern	Charles Thomas Brown
Thomas Ignatius Parkinson	Hiram Joseph Sullivan

The following members of the graduating class are entitled to their diplomas *cum laude*: THOMAS CAHALL, ALBERT NICHOLSON GARRETT, CHARLES HENRY HOWSON, CHARLES LOUIS MCKEEHAN.

Prizes

IN THE COLLEGE

I.

ENTRANCE PRIZES

1. THE B. B. COMEGYS PRIZES: one for the best special examination in Latin required for admission to the courses in Arts and Science; Equally to JONATHAN JONES and MORRIS WOLF; Honorable Mention of THOMAS DARLINGTON COPE; and one for the best special examination in Greek required for admission to the same course, to JONATHAN JONES.

2. THE EUGENE DELANO PRIZE, for the best examination in the French and German required for entrance to College. To MORRIS WOLF.

3. A prize, offered by the CLASS OF 1880, for the best examination in Mathematics, by a candidate for admission to the course in Arts and Science. To JOEL HENRY HILDEBRAND.

II.

FACULTY PRIZES

1. A prize for the best Essay in Intellectual and Moral Philosophy by a member of the Senior Class. Subject: *A Criticism of the Idealism of Berkeley*. To EDWARD ZIEGLER DAVIS: Honorable Mention of WILLIAM HENRY HUNTER.

2. A prize for the best examination by a member of the Freshman Class in Greek Prose Composition with the Accents. Equally to JONATHAN JONES and MILTON BENNEVILLE STALLMAN.

3. A prize to a member of the Senior Class, for the most meritorious work in the German Language and Literature over and above the regular course. To EDWARD ZIEGLER DAVIS.

4. A prize to a member of the Senior Class for the most meritorious work in the French Language and Literature over and above the regular course. (Not awarded.)

5. A first prize and a second prize for the best examination on the Lectures on Quaternions, given to the Voluntary Junior Class. To DEWITT DUKES BARLOW and JOAQUIN ANDRES DE DUEÑAS, respectively.

6. A prize for the best Essay in History and English Literature by a member of the Senior Class. Subject: *Cardinal Wolsey in the North: from his loss of office to his death*. To ALBERT OSWALD MICHENER.

7. A prize for the best Essay by a member of the Junior Class. Subject: *Mandeville, and his "Fable of the Bees."* To WILFRED BORN VOGT: Honorable Mention of FRANK BROOKE EVANS, JR.

8. A first prize and a second prize for the best Declamation by a member of the Sophomore Class, the contest being open to the public. To GRAHAM COX WOODWARD and LEICESTER BODINE HOLLAND, respectively.

9. A first prize and a second prize for the best and second best preparations illustrating the anatomy of any vegetable. To NORMAN SINCLAIR BETTS and MARY REBECCA SCATTERGOOD.

10. A first prize and a second prize for the best and second best preparations illustrating the anatomy or embryology of any animal. To HARRIET BOEWIG. (Second prize not awarded.)

11. A prize to the member of the Sophomore Class who shall pass the best special examination in sight reading of Latin. To RALPH BERRILL EVANS: Honorable mention of ELMER ELBERT CRAIG.

12. A prize to the member of the Sophomore Class who shall pass the best special examination in sight reading of Greek. To ELMER ELBERT CRAIG.

III.

ALUMNI PRIZES

1. THE HENRY REED PRIZE, founded by the Society of the Alumni, for the best English Essay by a member of the Senior Class. Subject: *The Masques of Ben Jonson*. To DANIEL MARTIN KARCHER.

2. A prize for the best, and a prize for the second best, Latin Essay by a member of the Graduating Class. First prize to CHARLES JASTROW MENDELSON; second prize to STANLEY FOLZ.

3. A prize for the best, and prize for the second best Original Declamation by a member of the Junior Class. (Contest took place Tuesday, June 12, 1900.)

IV.

GENERAL PRIZES

1. A prize founded by HENRY LABARRE JAYNE, of the Class of 1879, or the best English Composition by a member of the Freshman Class. Subject: *John Burroughs and the Literary Study in Nature*. (Not awarded.)

2. THE JOSEPH WARNER YARDLEY PRIZE, founded by the Class of 1877, in memory of their classmate, for the best Thesis in Political Economy by a member of the Senior Class. Subject: *The History of Government Credit Money in the United States Since 1860; with a Discussion of its Present Position in the Monetary System*. To WILLIAM CHARLES GRAYSON.

3. A prize founded by D. VAN NOSTRAND, Esq., for the member of the Junior Class in Civil Engineering who attains the highest general average of scholarship. To DEWITT DUKES BARLOW.

4. A prize founded by the PHI KAPPA SIGMA FRATERNITY, in honor of their founder, SAMUEL BROWN WYLIE MITCHELL, M. D., of the Class 1852, for the best work in English Composition done during the year by a member of the Sophomore Class. To LEICESTER BODINE HOLLAND: Honorable mention of WILLIAM HENRY CHORLTON, ADELINE HYNE-MAN JACOBS, GEORGE MORRIS PIERSOL, RALPH HODGES PLUMB, and WARREN FREDERIC THÜMMEL, JR.

5. THE GEORGE ALLEN MEMORIAL PRIZES, founded by JOSEPH G. ROSENGARTEN, Esq., for members of the Junior Class taking the Greek and Latin courses, as follows: In Greek, for the best examination on the *Oration of Demosthenes on the Crown*, read with the Professor as an extra subject. STANLEY FOLZ (for 1899); THOMAS FRANCIS CADWALADER, JR., (for 1900).

In Latin for the best examination upon selections from Latin Literature of the Empire, to be read with the Professor of Classical Philology as an extra subject. To BERTRAM HARPER ROGERS.

Second prizes in these subjects, offered by the College Faculty: in Greek, to HAROLD HARRISON TRYON (for 1899); in Latin, to HOWARD HUSTED DOWLIN.

6. The Kappa Kappa Gamma Fraternity offered its Table at the Woods' Holl Laboratory, Mass., for the summer of 1900, as a prize to students in the course in Biology. To HARRIET BOEWIG.

7. THE WILLIS TERRY PRIZES.—The following prizes, open only to students in the course in Finance and Economy, have been established by HENRY C. TERRY, Esq., as a memorial to his son, WILLIS TERRY, a graduate of the Class of 1896:

(a) A prize for the student of the Freshman Class who shall have the best standing for the year. To MORRIS WOLF.

(b) A prize for the student of the Sophomore Class who shall have the best standing for the year. To WILLIAM SCHWEBEL.

(c) A prize for the student of the Junior Class who shall have the best standing for the year. To ARTHUR DOUGHERTY REES: Honorable mention of JOHN HENRY RADEV ACKER, LEWIS EDWARD COLES and ALBERT WILLIAM PARVIN.

(d) A prize for the student of the Senior Class who shall have the best standing for the year. To HENRY REED BURCH.

(e) A prize to a student of the Senior Class for special research and investigation upon a subject to be determined by the Committee on

Economics, and relating to the financial and industrial conditions of the United States. Subject for 1900: *Present Industrial Conditions in the United States, with Special Reference to Trusts.* To WALTER BIDDLE SAUL.

8. The prize of membership in the T-Square Club. To IRA WILSON HOOVER and LOUIS MAGAZINER.

9. THE FRAZIER PRIZE. GEORGE H. FRAZIER, Esq., of the Class of 1887, offers annually a prize of a standard work in literature to be chosen by him, and of a value of one hundred dollars, to the student in the College of the University of Pennsylvania, who, being a member of the football team, baseball team, track team, or of the crew, shall attain the highest standing in scholarship. To ROBERT SMITH GAWTHROP, of the Junior Class.

10. THE "SONS OF THE REVOLUTION" PRIZE.—The Pennsylvania Society of Sons of the Revolution offers annually a first prize of seventy five dollars, and a second prize of twenty-five dollars, for the best and second best Essays on some subject connected with the Revolutionary Period in the State of Pennsylvania. Open to all students. First prize to WILFRED BORN VOGT; second prize to JAMES WHITFORD RIDDLE, JR.

11. THE JOHN STEWARDSON MEMORIAL TRAVELING SCHOLARSHIP IN ARCHITECTURE, open to architectural draughtsmen in the State of Pennsylvania over twenty-one years of age. To ALFRED MORTON GITHENS; second mention, LEON NARCISSE GILLETTE; third mention, CLARKE WHARTON CHURCHMAN and LLOYD TITUS, equally.

12. PRIESTLEY CLUB PRIZE. For proficiency in Chemistry. To GEORGE CLAUSEN FRIEND.

13. THE ASSAYERS AND MINERS GANGUE offers two prizes to members of the Post Senior Class. To HERBERT SPENCER TURNER.

14. TWO DEBATING PRIZES, established by WILLIAM WEST FRAZIER, JR.: a first prize and a second prize were awarded in a public debating contest to HENRY WOLF BIKLÉ and WALTER COGGESHALL JANNEY, respectively.

15. THE "SONS OF THE AMERICAN REVOLUTION" PRIZE—The National Society of the Sons of the American Revolution offer annually a Silver Medal for the best Essay on some subject connected with American Revolutionary History. Open only to Juniors. Subject: *The Principles fought for in the Revolution.* (Not awarded.)

IN THE DEPARTMENT OF LAW

CHARLES LOUIS MCKEEHAN has been elected a Fellow of the Department of Law for one year.

THE FACULTY PRIZES, for the best written examination with all the Professors. In the Third-year, to CHARLES HENRY HOWSON, with Honorable Mention of CHARLES LOUIS MCKEEHAN.

In the Second-year, to HENRY WOLF BIKLÉ: Honorable Mention of LESTER BICKNELL JOHNSON, ROBERT WODROW ARCHBALD and ELIAS WILBUR KRIEBEL.

In the First-year, to HORACE STERN: Honorable Mention of THOMAS IGNATIUS PARKINSON.

THE P. PEMBERTON MORRIS PRIZE, for the best written examination in Evidence, Pleading and Practice at Law and in Equity, equally to CHARLES LOUIS MCKEEHAN and CHARLES HENRY HOWSON: Honorable Mention of THOMAS CAHALL and PETER BERNARD STEFFEN.

THE SHARSWOOD PRIZE, established by the Alumni of the Department of Law, for the best Essay by a member of the Graduating Class. (Not awarded.)

THE MEREDITH PRIZE, established by the Alumni of the Department of Law, for the second best essay by a member of the Graduating Class. To SAMUEL MICHAEL ISRAELI, for his essay, entitled: "*The Nature of the Liability of Shareholder of a Corporation under Statute Imposing a Liability Additional to that of the Stock Subscribed.*"

IN THE DEPARTMENT OF MEDICINE

THE ALUMNI MEDAL, with an accompanying Purse of Fifty Dollars, to the member of the Graduating Class who attains the highest general average in examination. To JOSEPH MASTBAUM ASHER.

The Prize of One Hundred Dollars, offered by a friend of the Department to the member of the Graduating Class who passes the best examination in Obstetrics. To JOSEPH MASTBAUM ASHER.

The Prize of a copy of White and Martin's Genito-Urinary Surgery, offered by the Professor of Clinical Surgery to a member of the Surgical Ward Class for the best report of that service. To JOHN MARTIN TAYLOR: Honorable Mention of WALTER STEWART CORNELL.

The Clinical Professor of Orthopædic Surgery offer a prize of an Antiseptic Minor Operating Case for the best practical work in Orthopædic Surgery, or for the best report of his clinic, or for an acceptable original design in Apparatus. Equally to FREDERICK MARSHALL PAUL and CHARLES BROWNE: Honorable Mention of the Report of ASTLEY PASTON COOPER ASHHURST.

A Prize of a Surgical Pocket-case is offered by the Demonstrator of Anatomy, to the member of the Graduating Class who presents the best record of anomalies found in the anatomical rooms. To FREDERICK MARSHALL PAUL.

The two Prizes offered by the Demonstrator of Surgery are awarded as follows : A Surgical Pocket-case for proficiency in Fracture Dressings and in Operative Surgery. To ROBERT DAVIES RHEIN. A Surgical Pocket-case to PENN-GASKELL SKILLERN, JR., of the First-year Class, for proficiency in Bandaging.

The ZENTMAYER PRIZE of a Microscope for the best examination in Histology and Embryology. To GEORGE WASHINGTON GEYER.

IN THE DEPARTMENT OF VETERINARY MEDICINE

THE J. B. LIPPINCOTT PRIZE of one hundred dollars, awarded to the member of the Graduating Class who, in the three years spent in the Veterinary Department of the University, attains the highest general average in examinations. To ERNEST LINWOOD CORNMAN.

A prize of an Ecraseur, offered by a friend of the Department to the member of the Second-year Class who passes the best examinations in Veterinary Anatomy. To JOHN WILBUR HAYMAN.

INVOCATION.

By the Right Rev. Ozi W. Whitaker.

Almighty God, the Creator of all things, the source of life, and the giver of every good and perfect gift, who makest the sun to go forth as a bridegroom out of his chamber, and rejoice as a giant to run his course, so that nothing is hid from the heat thereof; we thank Thee for the light; for the verdure with which Thou hast made the earth beautiful; for fruits and flowers; for the shining sun, and the springing rain; for the garden and the field; for the mountain and the sea. Above all we thank Thee that Thou hast given us Thy Son, our Saviour Jesus Christ, to be the light of the world, guiding us in the way that leads to everlasting life. May our hearts be open to receive the Son of Righteousness; may the warmth of Thy Holy Spirit kindle all our hearts with heavenly love, and so may all that is of the earth teach us more and more of Heaven, and may we, receiving evermore the good seed of Thy Word, bring forth the fruit of righteousness to Thy praise and glory, through Jesus Christ our Lord. *Amen.*

May Thy blessing rest upon this Nation: upon the President of the United States, and all his advisers, and associates, and subordinates upon the sea and upon the land. Endue them with wisdom to discern the right, and steadfastness to maintain it. Prosper, we beseech Thee, all their undertakings, to the establishment of righteousness and peace, that all things may be so ordered and settled by their endeavors upon the best and surest foundations, that quietness and happiness, justice and truth, piety and religion may prevail amongst us for all generations.

And wilt Thou grant, O Lord, to all Nations the blessings of peace. Hasten the coming of the time when cruelty and oppression shall cease throughout the world,

when nation shall not lift up sword against nation, and they shall learn war no more.

We commend to Thy gracious care and keeping the University of Pennsylvania, in whose interest we are assembled. We thank Thee for the prosperity which is attending it. May Thy blessing rest upon every effort made to secure its foundations and to extend its usefulness. May its entire administration be for the promotion of sound learning and Christian principles. Inspire its officers and teachers with an abiding sense of the sacredness of the trust committed to them. Bless its students with healthful bodies, and clear minds, and pure hearts. Keep them from vain self-confidence. Make them willing to follow the counsels of wisdom and experience, and defend them from the assaults of the world, the flesh, and the devil.

Especially do we ask Thy blessing upon these young men and women who have completed their course in the University, and are now going forth to their life work. Bestow upon them the fullness of Thy grace, and the continual guidance of Thy Spirit. May they be honest and true, diligent in service, conscientious in the discharge of every duty, and faithful in every relationship which they sustain. May they fulfill their course with honor in this life, and attain the glorious destiny to which Thou hast invited them in the life to come, through Jesus Christ our Lord.

Hear us, O Lord, we beseech Thee, in these our petitions; and as we pray together in the words which Christ our Lord gave as the model of our prayers:

Our Father, Who art in heaven, Hallowed be Thy Name. Thy kingdom come. Thy will be done on earth, As it is in heaven. Give us this day our daily bread. And forgive us our trespasses, As we forgive those who trespass against us. And lead us not into temptation; But deliver us from evil: For Thine is the kingdom, and the power, and the glory, for ever and ever. *Amen.*

The grace of Our Lord Jesus Christ, and the love of God, and the fellowship of the Holy Ghost, be with us all evermore. *Amen.*

COMMENCEMENT ADDRESS.

By William L. Prather, Esq., President of the University of Texas.

MR. PROVOST, OFFICERS AND STUDENTS OF THE UNIVERSITY OF PENNSYLVANIA, LADIES AND GENTLEMEN :

I have come at your bidding over many broad leagues of land, to take part in these imposing ceremonies which are beginning to possess an almost national interest; and to bear to you, one of the oldest and most venerated institutions in the land, the friendly greetings of the youngest in the fair sisterhood of Southern universities.

When I received your invitation, I felt that it had an unusual and peculiar significance, and was the concrete expression of a community of ideal and purpose that is fast knitting bonds of sympathy to join the culture of the East with that of the great South and West. Deeply sensible of the honor that has been conferred in inviting me to address you to-day, a far deeper sense of responsibility lies upon me in the realization of my opportunity to interpret to you adequately the hopes and ideals of that part of our common country from which I come, and to make you realize the significance of these hopes and ideals for the future development of our common intellectual life.

When your invitation was first received, four honored members of our medical faculty, who proudly recognize this great university as their Alma Mater, said to me, "Go; and tell them of us and of Texas." Were it not for the presence of one of them in this audience to-day, I should venture to tell you something of their worthy careers since they left these honored halls. But I will show our appreciation of their wisdom in the more practical way of following the advice they gave, taking only the liberty to reverse the order

of the two significant subjects which they proposed; and I will speak to you first about Texas, and then about ourselves.

It may seem to you that I am limiting myself in such a choice of subjects to matters of local and personal interest. You may expect me to tell you that Texas is broad enough in territory to swallow up the Keystone State, the Empire State, and the whole group of New England States; that Texas is capable of supporting a population of forty millions of people within her borders, or, to use the somewhat imaginative language of one of our own students, "Lay Texas across the face of Europe, and this giant, with his head resting upon the mountains of Norway, with one palm covering London and the other Warsaw, would stretch himself across the kingdom of Denmark, across the empires of Germany and Austria, across Northern Italy, and lave his feet in the blue waters of the Mediterranean." These facts of geographical magnitude I might supplement by others of equal commercial significance, and I might tell you of our cotton and our corn, of our cattle and our railroads, of our newly discovered mineral wealth, and of our freshly projected mills and factories. But, my friends, we are ceasing to talk of our broad acres and our cattle upon a thousand hills, and we are coming to dwell rather upon the intellectual and spiritual life of our people, and to cast up its enormous potentialities for the future of our country. We are learning to discern that the greatness of a people lies in their history and their character, and not in their lands and their railroads; in what they are, rather than in what they possess. It is to facts about Texas which have significance for our national culture and our national political life that I would direct your attention, when I choose this subject of Texas.

I would point you first to the fact that this great commonwealth is a representative commonwealth, and one whose life and history you must fully and clearly under-

stand and reckon with, if you are to know the future of your country. For in Texas are blended all the characteristics significant of both South and West, and in the history of Texas is clearly and unwaveringly expressed that purpose of individual freedom and political liberty which first called this nation into being.

In speaking to you of Texas, therefore, I am not limiting myself to matters of local and personal interest.

I believe that in point of talent, inherent strength and independence of character, the population of Texas is unsurpassed upon the face of the globe. When to the race of heroes who founded this Empire of the West, was added that noble increment of the very flower of Southern manhood and womanhood from every state of the South, as a result of the civil war (and this was supplemented by those enterprising spirits from the North and East and from beyond the seas, who came seeking broader fields for the employment of their restless energies), we find gathered within the borders of Texas a heterogeneous population possessing the highest elements of individual strength and excellence. They need only the blending influence of a common education, and the welding power of lofty patriotism, to make a homogeneous people whose combined strength will deliver itself with Titanic power upon the great problems of the coming century.

It was Gladstone who said, "The American Constitution is, so far as I can see, the most wonderful work ever struck off at a given time by the brain and purpose of man." This mighty achievement resulted from the effort of a great people, inspired by lofty purpose, and sustained by sublime faith in the justice of their cause. The history of the world demonstrates that great men are developed by great emergencies. Nowhere is this truth more clearly exhibited than in the settlement of a new country, where the people are unfettered by traditions, customs and usages, which hamper the exercise of perfect freedom.

If the American forefathers, therefore, astonished the nations of the earth by founding the best government the world ever saw, we should naturally expect their sons, who had enjoyed the inestimable blessings of liberty for more than a generation, when they came to establish the "Lone Star Republic of the West," to make still further advancement in founding their institutions and framing their laws.

The various states of the Union contributed to the early settlement of Texas a population already "matured and experienced in the pursuits of a high civilization, largely intermixed with cultivated talent, native capacity, shrewdness and strength;" a people well fitted to create and successfully maintain a new government amidst the trials through which it was destined to pass. "A sparse population were monarchs of an almost boundless domain, abounding in plenty and teeming with promise of a glorious future. Land was given to every citizen, not by acres, but by miles and leagues. Supreme upon their princely domain, open hospitality and independence of character, like that of feudal barons, distinguished the early settlers of Texas. Accustomed to danger and inured to hardships, they were sturdy, brave and generous."

Such was the environment, and such were the characteristics, of a people which gave birth to new ideas in government, furnished new standards of heroism, and afforded scope for the advancement of new theories of law.

From this marvelous condition of things the unrepressed genius of the early Texans, *First* among the English speaking race abolished imprisonment for debt; in the administration of remedial justice in the courts, *First* abolished all distinctions between law and equity, and gave the right of trial by jury in cases in equity as well as in law; *First* established the true equality of woman with man, by recognizing her separate and community rights of property; *First* evolved for the protection of the family

the great idea of the homestead and exemption laws; and, finally, crowned these everlasting triumphs by laying broad and deep the foundation for the free education of the people.

Hitherto the laws of all nations had been framed by creditors, who stood next the throne of power; and these laws looked to the protection of the creditor rather than the debtor. Under the laws of Rome, the debtor might be drawn and quartered, or sold as a slave beyond the Tiber. In our mother country of England, after all his property had been taken, the debtor might be imprisoned for debt; and this law existed in a modified form in many of the American states. But Texas, recognizing that a stable government must rest upon the undisturbed homes of the people, by her laws gave to each head of a family large donations of land and sufficient stock, tools and provisions, to cultivate the land and provide for the support of the family, and guaranteed him against the seizure of them by creditors. The founders of the republic thus declared a new principle to the world, which placed the claims of family and of blood above mere claims of money. They declared that a Texan should not be imprisoned for debt; that the brain and muscle of a free man should not be mortgaged; and that limitations should be so placed upon the demands of creditors that a home, and the means of enjoying it, should be guaranteed to every citizen.

This was a declaration in behalf of humanity. It was a new gospel of liberty which came not from the East, but was first proclaimed by the great and wise men who followed the star of liberty and empire, as westward it took its flight, until it came and stood over the infant Republic of the West.

Not only did these noble Texans enunciate new principles of government, but by their deeds of valor they established a new standard of heroism for the world's imitation. Hitherto "Spartan courage" had been the

highest ideal of human bravery, and the heroism of Leonidas and his gallant three hundred, who held the pass at Thermopylæ until all but one had perished, has been immortalized in song and story. But when the blood of the patriotic Bowie, Crockett, Travis and Bonham and their compatriots was poured as a precious libation upon the altar of the Alamo, and naught was left but its blood-stained walls to tell the story of their dying valor, there was given the sublimest exhibition of human consecration the world has ever witnessed. And never did a redeemed and grateful people inscribe a grander epitaph upon the tomb of their mighty dead than the tribute written upon those hallowed walls: "Thermopylæ had its messenger of defeat; the Alamo had none!"

The Texas Declaration of Independence has in it clarion notes of liberty clearer than ever sounded in the Declaration of '76; but they were clearer and stronger because its authors had caught the inspiration from the exultant tones of Liberty Bell, on Independence Hall, as it rang out the glad notes of freedom to mankind. But in the early history of Texas we have not only high ideals of liberty and noble patterns of heroism in defence of them: we have also the establishment of national means of enlightenment.

In that grand Declaration of Texan Independence we find among the grievances alleged against the Mexican Government, these words: "It has failed to establish any public system of education, although possessed of almost boundless resources (the public domain), and although it is an axiom in political science that unless a people are educated and enlightened, it is idle to expect the continuance of civil liberty or the capacity for self-government." Fifteen days after that declaration was made, the first Constitution of the Republic of Texas was signed, in which this language was used: "It shall be the duty of Congress, as soon as circumstances will permit, to provide by law for a general system of education." Thirty days thereafter

Houston, on the field of San Jacinto, avenged the butchery of the Alamo. Texas boldly made her demand for public education in the face of an invading foe, and from her council chamber sent forth her statesmen as her warriors to enforce this demand upon the field of carnage. Scarcely had the smoke of battle cleared away, when we find Texas providing a comprehensive system of public education with a university at its head, and granting a rich dowry of lands from the public domain for the whole. President Lamar, himself a scholar, a poet, and a statesman, in his message to the Third Congress of Texas in 1839 truthfully said: "Cultivated mind is the guardian genius of democracy, and while guided and controlled by virtue, is the noblest attribute of man. It is the only dictator that freemen acknowledge, and the only security that freemen desire." Resting upon this profound truth, Texas, as a sovereign Republic of freemen, recognized it as her high duty to provide for the education of her children. Her proud record is unique. She alone among the states of this Union achieved her independence single-handed: she alone had a separate national existence. My countrymen, it is something to have a history all your own; and such a glorious history! "Athens had her Marathon, and Sparta her Thermopylæ; but San Jacinto rivaled the one, and the Alamo excelled the other; and both legends blaze proudly on the stainless escutcheon of Texas."

But while we Texans are proud of this history as a noble heritage won for us by our forefathers, we feel that it is but a part of our rich American birthright; that ideal which is expressed in the words "liberty and enlightenment"—common liberty and general enlightenment. We are identified by it with the tremendous march of these two great ideas as closely as Pennsylvania is by Independence Hall, or as Massachusetts is by the memory of Concord and Lexington. And I have brought it to your attention because I feel that this heroic past is the one thing we

must not let slip in the education of our youth ; that these are the bonds which weld a nation. And it is in relation to this ideal of national unity that such history as I have recited has its full significance.

The idea of national unity is as yet young. We have been geographically a nation, territorially a nation, governmentally a nation, ethically a nation—for a century. But the development of a true national unity in the fullest sense of the term is one of the great problems for the education of the future—a problem whose significance and importance we must be fully awake to.

It is hard for us to realize how short the time is since the bulk of the commercial activities of the United States was carried on mainly at its Eastern seaboard—a fringe of great cities with the "Great West" behind. There was a North of dominant opinion, a South of suppressed opinion, a West of no opinion. But these days have passed away. The commercial unity of the country is a recognized fact ; its political unity is now something more than an academic proposition. There is another great step in this process of national integration to which I would like to call your attention, for I perhaps am in a better position to see its progress than you. My personal experience goes back to a period when the great state from which I come, now covered with a network of railroads, shipping its products in all directions, competing on an equal footing with the other great commonwealths of this Union, was accessible only by the emigrant's wagon. My personal experience also goes back to a period when the clash of civil conflict gave bitter evidence of the fact that at least two portions of this country did not think alike in matters political. I have thus seen the growth of a national unity in commerce ; I am seeing the growth of a national unity in politics ; and I hope to see the growth of a national unity in culture.

You are prone to think of us as new in culture, but you

forget that we had your culture to start with; that we have carried your best ideals into new conditions and have developed them; that, as we compete commercially with you, as our ideas and yours in political matters must find a just mean to be expressed in forms of government and in national policies, so will our ideals in culture take rank with your best ideals and ultimately find a place alongside them, to the development of a great national intellectual life—a culture which knows no East, no West, no North, no South.

I come to you from a university which has been seeking with an intense eagerness, and a full appreciation of the issues at stake, to develop a form of culture which need not blush when asked to take its place beside your own. It is undoubtedly new, and has yet much to learn; but it is a thing which you will have to take into account if you are to understand us—nay, if you are to understand yourselves. It is a part of a great national intellectual life, just beginning to unfold itself as a characteristic of our common nation—a nation which is really now a nation in a sense in which it has never been a nation till now; a nation whose future is more promising and more hopeful for the best interests of mankind than that of any other nation in the world. This is not “eloquence,” not rhetoric, but fact. It is writ clear and large in the signs of the times. Littlenesses we undoubtedly have; prejudices we have; moral obliquities in national conduct and in governmental administration are frequently and painfully brought to our notice: but despite them all, if civilization is not to die out utterly from the faith of men, there is no place to which the world can turn more eagerly, as it attempts to cast up the probabilities of the future, than to this nation of which you and I have the proud privilege to be citizens. And you and I are making a most serious mistake when we allow ourselves to feel discouraged in the face of these things I have mentioned, and lend a listening

ear to a desponding utterance which implies that the mission of our country has already fulfilled itself, and that we stand on a less elevated moral plane than we did when our Declaration of Independence was written.

But it is not my purpose to speak of what I conceive to be the commercial and political mission of this great country, but rather to bring before you, if I can, for a moment, a great and wide conception of its intellectual mission. I would not call your attention to our past triumphs in the domain of commerce; but I would make the attempt to bring before you the intellectual triumphs which await a nation of eighty million souls, enjoying opportunities of culture that are accessible to all, from the meanest to the highest, untrammelled by artificial social distinctions, possessing a quickness of intellect and adaptability that goes hand in hand with solid and sturdy moral character, to form the best foundation for the best kind of intellectual culture; and possessing those elements and characteristics in a measure and degree unequalled among the nations of the world. This is our opportunity, and if we fail to realize it, we are failing of a full conception of our national duty.

The point, therefore, I would press home to your attention is the necessity which confronts us of passing from a local ideal of culture to a national one. At present there is in our intellectual life much diversity of ideal and method; much restless seeking after new ideals and methods in some quarters; much persistent holding to old ideals and methods in others. There are ideals of conduct in the West and South that are not clearly understood in the East; there are economic ideals in the East that are often misunderstood in the West and South; there are ideals of culture, using for a moment the word in its narrower sense, that are prevalent in the West and South, yet are somehow different from those prevalent in the East. Each of these parts claims to represent the best ideals of the whole.

It is indeed a wide vision that can see these differences as they are, and a keen vision that can pierce through their conflicting details to a clear perception of the unifying influences that shape and control them. But unifying influences there are. One of them is that fast developing consciousness of a national political unity, founded on a common history; and the other is a yet-to-be-developed consciousness of a national intellectual sympathy. I would, therefore, urge you not to expect us to seek culture under your conditions, not to expect us to send our young men and young women to Eastern universities for their training in liberal arts, but to aid us with your intelligent sympathy and your fraternal co-operation in the efforts we are making to establish in younger commonwealths and newer conditions, centres of culture like those the privileges of which you have so long enjoyed. You still will have your true function to fulfill in the furnishing of opportunities for advanced scholarship or wide professional training to such of our young men and young women as desire them—opportunities associated with long experience and rich resources. In this field we cannot compete with you.

Our competition with you must lie along the lines of disciplinary culture. Here we can compete with you, and perhaps advantageously; for in the freshness and enthusiasm of our young manhood and young womanhood, in the independence and vigor of the intellectual life of our young men and young women, we have advantages which perhaps you do not possess.

But this competition must be in a spirit of friendliness and sympathy. One of the happiest results which the intercommunication of education has wrought is the larger ability to discuss philosophically, wisely, and with less passion and prejudice, the great questions affecting us as a nation and parts of the same nation. We should never forget that we are brothers, members of the same household; that this nation is a family of states; and that what-

ever affects favorably or unfavorably the welfare of one, affects the whole nation. We must rise to a true conception of this idea if we would in the future avoid sectionalism, and secure the welfare of the whole people rather than the welfare of a particular section. Truth and frankness should characterize our dealings with each other as individuals, as states, and as a whole people. One of the most potent forces now contributing to the development of such a national sympathy is the State University.

If it be true that "the arrival of democracy is the fact of our time, which overshadows all other facts," the very incarnation of true democracy is found in the modern State University.

A university for the people without distinctions of rank is the regenerating thought of the new world. In the glorious progress of American manhood and womanhood, universities are the torchbearers of American civilization. It is a serious error on the part of our politicians to charge that the great teachers and thinkers of our universities are mere theorists. No wiser step has been taken by our rulers than when they utilized in the affairs of government, the training, the learning, and the wisdom of the scholars of this nation. They brought to their aid the lessons of all history, and bravely applied them to the solution of new and perplexing problems, thereby enriching the achievements of American statesmanship. To these great centres of learning planted in every state of this rapidly expanding union, as well as to our common schools, we must look in the future for that stalwart and vitalizing American sentiment which shall not only withstand, but shall quickly transform and assimilate, the uninstructed foreign population now flocking to our shores. Our safety as a people demands a wise and vigorous effort to educate the masses to an intelligent appreciation of the blessings which we as freemen enjoy. The educational forces of this country are doing a great work towards breaking down sectionalism,

allaying party strife and promoting the peace, prosperity and unity of this nation.

It is my clear conviction that it would be wise for the American people to cease establishing new colleges and universities, and to concentrate their efforts in strengthening those already founded, thereby increasing their power and efficiency. The State University at the head of the state system of education is an evolution of the best Western thought, and the noblest civic achievement of the Commonwealth. There should be the closest and most harmonious relation between the university and all the educational agencies of the state. As the university grows, its magnetic life should pervade every district school, and be an inspiration and blessing to all good learning. The system of elementary and secondary education should culminate in the university.

The true measure of the worth of any university is found in the pure and forceful character of its graduates, and their readiness to employ their talents and culture to serve the highest good of their fellowmen. Dishonesty among the student body of a university is an impeachment of its education.

If the newer universities, thus developed from the expanding intellectual life of our people, are tied in bonds of closest sympathy and fraternal co-operation to the older universities already established, and so unite with them to maintain the highest ideals of American life and American thought, the time is not far distant when American culture shall be a national culture, exerting on the nations of the earth an influence as wide and potent as was that of Greece and Rome in uplifting and enlightening the world.

Young ladies and young gentlemen, it has been your privilege to enjoy the advantages of this noble seat of learning, which is a fitting type of this great and venerable Commonwealth. You have here breathed an atmosphere saturated with the influence of honored names and lofty

examples, and have felt the inspiration which a real university always gives to her sons. It has substituted in your breasts the love of learning and humanity for the love of meaner things. It has been to you, I trust, a fountain of pure and noble ideals. As Robert Browning wrote amid scenes famous in the history of his own land: "Here and here hath England helped me—how can I help England?" The sense of responsibility and duty is the kernel of patriotism—how can we help America?

These honors which you to-day receive have not been lightly won. They represent strenuous effort and toil during months and years that are past, while character was being built up by slow accretions. These diplomas are your commissions for leadership in the moral and intellectual contests in which you are to engage. Take with you into your future life that nobleness of principle that requires no effort to be brave and true—that dignity and loftiness of character that holds fast only to that which is good—"that exquisite education of the conscience that makes duty and benevolence the habit of the soul—that fastidious honor that cannot in thought condescend to meanness." In the garden of human life the flower of character most richly repays all that its culture can cost. Character is above all learning. It stands in majesty, unawed and unmoved, before men and devils—aye, it stands confident and trusting in the presence of God Himself.

As I walked through your historic grounds and looked upon the noble aids to culture which successive generations have there accumulated as a rich heritage for the inspiration and education of the young, I recalled a touching incident told of one of England's most worthy and forceful statesmen. Morning after morning he would enter the old family gallery, and there stand almost as if in worship over against four ancestral portraits. Sometimes he would be heard to murmur: "I'll not forget"—sometimes, "I'll be true." His oldest boy had often watched him

with awed wonder, and at last was taken by the hand into the gallery. Set by his father before the oldest of the pictures, its name well known, he heard his father say: "You, too, must hear them talk." "What, father, how can they speak?" "My boy, for fourteen years they have spoken to me every morning I have walked beneath this roof, and each has his own message. He says, 'Be true to me,' and he, 'Be true to your race.' He says, 'Be true to thyself, and she, my mother, says, 'Be true to God.' " O the power, the pathos of the teachings of a great life! Precept is powerless without example. Precepts derive their force and confirmation from the daily life of the teacher who inculcates them. Far above all your stately buildings and splendid equipment is the awakening and inspiring spirit of the Great Teacher. He is the living steel which strikes the spark of genius and kindles the fires of noble ambition in the heart of youth, whose ever ascending flame shall light the highways of human knowledge.

There is no more hopeful sign of our times than that shown by the munificent gifts recently made for the advancement of learning in our country. No truer patriot lives than he who gives liberally of service or of substance for the free education of the people. This is the hope of American democracy and presages the perpetuity of American liberty. If other nations spend millions to prepare men for war, America should spend millions to prepare them for peace.

Great as is Pennsylvania in commerce and wealth, all her resources combined do not accomplish more towards giving her a noble name in other states of this Union, and throughout the world, than does this University of Pennsylvania. For a commonwealth to establish and its citizens to maintain an institution like this, with its ever widening influence and its blessings going into the remotest corner of the state, is the highest and soundest wisdom that could be exhibited by any people.

The hopes and fears, the aspirations and triumphs, the intellectual and moral life of the people of this grand old Commonwealth, so rich in the achievements and memories of a historic past, have found expression here. No splendid future awaits a state or nation which fails to cherish veneration for a magnanimous past.

O son of Pennsylvania, "Love thou thy land with love far-brought from out the storied past!"

GRADUATION SERMON.

By the Rev. John Sparhawk Jones, D. D.

Preached before the Graduating Class of the University, at Calvary Presbyterian Church, Philadelphia, on Sunday, June 10, 1900.

"I must work the works of Him that sent me while it is day; the night cometh, when no man can work." JOHN ix. 4.

Sharing the opinion of their time, Christ's disciples inquired whether a man born blind, whom they happened to fall in with, had sinned in a pre-existent state. Their Master replied, "No," that the case admitted of another solution; intimating that it would be neither pertinent nor profitable to seek the philosophic cause of this unhappy phenomenon. He bid them be content with the immediate and practical outcome of the affair; which simply amounted to this: that "here was an opportunity of doing good and an event that furnished an additional proof of His messianic character." The primary application of the language respects *Himself*. Jesus announces a high, peculiar consciousness, and declares that He is charged with a commission which must be transacted within a limited time. "I must work the works of Him who sent me, while it is day." This presentiment took possession of Him very early. At the age of twelve years, runs the record, He was found in the Temple, at Jerusalem, interrogating the doctors of the Mosaic law, and surprising them by His precocity; but for some reason He retired to

the privacy of home-life, and spent a full decade and more in Nazareth, assisting Joseph—His putative father—whose trade was that of a carpenter. During this interim, both mental growth and religious conviction proceeded apace with Him, and through the silence and obscurity of these uneventful years, Jesus was slowly ripening for that short but immortal work He subsequently undertook. Not by the study of books or parchments, not by contact with men, not in the hurly-burly and racket of the driving world, was He prepared to step out, at length, upon the arena of public life: the curriculum through which He passed was rather one of reflection, of introspection, of contemplation. God, Nature, the Universe, Providence, the moral kingdom, prayer, the performance of plain, practical duties; these were the elements of His education: and in addition to these, there came, doubtless, exceptional revelations to His soul, doors opened into heaven, blue rifts in the sky, letting Him look once in a while through the clouds of darkness and doubt that beset all human affairs. Voices, presentiments, hints and flashes, tending to quicken His perceptions, broaden His view and confirm His faith: *these* also were part of His preparation. *Without* such a supernatural element it would be hard to explain the absolute familiarity and definite knowledge respecting divine truth and the purpose of God, which Jesus displayed. Those private years of retirement were the preparatory stage, during which His ideas and beliefs were corroborating, girdling themselves like mighty trees, with rings of solid fibre and invincible strength. So that, at length, when He took the field, and stood up in Jewry, and offered Himself as the Heir of David's throne and the predicted Prince, it was with no fear and trembling; with no misgivings; with no apology for His apparent presumption; with no hint that it was a tentative experiment and that He would gracefully retire if His overtures were rejected: *none of this in Jesus Christ!* He spoke

with authority; He published His ultimatum; He predicted the temporary eclipse of His cause; He looked beyond the cloudy contests of His time to a clear sunset and a final ovation. He saw distinctly that He would be temporarily defeated. He cherished no illusions: He laid His account with facts as He foresaw them. But through the dust and smoke of centuries He espied the banner of His gospel high in the air, and moving toward its world-wide ascendancy. Toward this grand climacteric and settled conviction He was, doubtless, slowly growing up, during the youthful years in Nazareth. "The mind is its own place." It is not necessary for one to be conditioned thus and so, to be set down in a particular connection or environment, before he can mature his plan or work out his thought. The few immortal books that have appeared in this world have arisen not infrequently out of unpropitious circumstances. In garrets, in prisons, in hospitals, at battered desks, they first saw light, and sprang full bodied, vascular and brawny from the teeming brain of their creators. The books, ideas, policies that have shaken the world and created epochs, have not always issued out of richly carved and highly varnished folding doors: they did not tread soft velvet carpets or get themselves bound in gilt and morocco, with dainty golden clasps; these shining summits they climbed later. At first they scarcely got a hearing, were "sown in weakness;" but having vitality, won their way, until their line went forth into all the earth and their words were spoken in the uttermost parts. So it has been with remarkable men and with prolific ideas; neither of them has been produced nor ripened, under conditions antecedently favorable. Go visit the little workshop where Galileo, Wollaston, Davy reflected and experimented, and you would likely find a small tray, a few trinkets, and nothing whatever betokening the eminence of the man or the value of his services. Go see where Dr. Johnson wrote his "Lives of the Poets," or Shakespeare his dramas, or Bun-

yan the "Pilgrim's Progress." Go see the place where the "Order of Jesuits" first loomed dim in idea before the fancy of the sick and wounded Loyola. Go see where Milton wrote the "Paradise Lost," or Locke his "Essay Concerning the Human Understanding;" or Edwards his metaphysical treatises. Go look at the chairs upon which the signers of the Declaration of American Independence sat, and the belated desks and tables at which they penned their reverberating proclamations. Go to the birthplace of any idea, invention, discovery, that has filled the face of the earth with fruit, and note the enormous disparity between the surroundings and the results. It seems to be the fact that when men get ready for a grand event or ovation, *it does not come*; whereas that which is unexpected and apparently out of the question is the thing that actually happens. We are not wise enough to tell the ripe conjunctures for great and beneficent movements. We pick out a certain set of conditions which seem auspicious, but Time convicts them of incompetence. Thus, the thought occurred to the first Christian disciples to install Matthias in the apostolic college, in the room of Judas of Iscaria; but the New Testament tells little of him or of his ministry. It does, however, make mention of one Saul of Tarsus, chosen of God, a little later, who shook his age and gave the gospel to Europe. 'Tis often so. When the world imagines itself on a critical hinge of affairs, nothing happens, a "laughable little mouse is born:" conversely when all is quiet, dull, stupid, in a barren age of bronze, or iron, or clay, from out of the dead level of mediocrity, a prophet of God—a mighty soul, an oracular man of powerful talent, who has an eye to see and a tongue to tell, like the angel stirs the stagnant pool, awakening the world to greet a new morning. God chooses His own men and times, and neither of them is usually expected or heartily approved. This accounts for the fact that the contemporaries of Jesus stumbled at His appearance, and demurred

against Him as not the manner of man they were looking for. They could not pardon informalities; they laid stress upon punctilios and accidents. They forgot that the main concern is *the idea*, the intrinsic value and native nobility of the thing in question. Be that as it may, it is perfectly clear that when Christ entered upon His ministry He was possessed of an absolute certainty in regard to Himself. Hence His utterances were authoritative, definite, decisive: "I am the light of the world;" "I am the shepherd of the sheep;" "I am the door;" "I am the way;" "I am the resurrection and eternal life;" "He that drinketh of the water I will give him shall never thirst;" "He that hath seen me hath seen the Father;" "I must work the works of Him that sent me." Whatever men may think of such positive affirmations, they imply a clear, unwavering assurance upon His part of a divine call, of a genuine message to mankind. And, second, generally speaking, this is a highly satisfactory state of mind, and a cardinal conviction for one to hold. Of course, it need not be said that the work of Christ was unique and can never be reproduced, in the nature of the case: it lay in another stratum than that in which men dig and delve. It was revelatory; it disclosed the nature and purpose of God; it made provision for the redemption and progression of human souls along ages to come. It was prophetic; it was priestly; it touched upon questions of duty and destiny; it also exhibited the ugly deformity of sin, and offered to break its yoke and cancel its guilt. It set up an ideal of righteousness, a type of character that should be supreme for conscience and conduct. Viewed from any side the work of Christ is unique, without precedent or parallel. No man can claim, in the sense in which He said it: "I must work the works of Him that sent me." No man can approach His singular attitude or repeat the challenge He flung out, with sublime composure, upon the world. Jesus stands alone: the radius of His

circle was longer than ours, its periphery swept in an unspeakably wider range of truths and certainties. He perceived divine essences and properties, and the realm of the supernatural, with a directness and immediacy that belongs to our organic senses. With Him it was indeed "a vision and a faculty divine," an exaltation of the mental and moral consciousness which we cannot conceive. So that any language Christ employs in relation to Himself may be applied to men only in an accommodated sense and conditionally. While this is true, and with this proviso, it is yet lawful to say that unto human beings ushered upon this theatre of life there is also "a work and a day." If not, in the sublime meaning of Christ's utterance, none the less in a real sense, is it true of every man who steps forth upon this human stage of activities and avocations, that he has "a work to do and a day to live." Each one has "a day," that is, a fixed period of the world's history to make proof of his natural powers, and to invest his talent and show his aptitudes. Over this matter one has no control. You cannot choose your day in the great year of universal history. One's life, whenever it sets in, is his "day" and he must make the best of it. God has caused many successive eras to flit across the face of Time, and each of them has been a "day" to its populations. We read of "Noah's day," and "Abraham's day," "the day of patriarchs and of prophets." We read of the age of absolutism, of Cæsarism, of the dark age: the age of literary revival, of maritime discovery, and colonization. We read of the age of Pericles in Athens, of Lorenzo and Leo X in Italy, of the age of Roundhead and Cavalier, of Tory and Leveller, of the days of "The Terror" and the French Revolution. It is a commonplace to say that there have been epochs in the world's long story; and the nation that has not passed through convulsions, that has not dropped like a canal boat from level to level, that has not been detained by locks and washed by

storms, hardly stands among the progressive peoples of the earth. Moreover, as it regards the individual, his particular day is that total of tendencies and of conditions in which he finds himself—the social, political, religious attitude of his time. The opinions which men entertain, the ambitions they cherish, the scent they follow, the values they esteem most highly, their principles, the spirit of the age; *these make up one's day* in a large sense. And obviously it is a matter in which he has no option. Probably there are always those who think they would like to have lived in other times, and to have looked upon the faces of men and women of gigantic girth and stature, of whom history tells, and who have played their part. There are always some disposed "to praise the time past," and who conceive that they who have left the boards were more noble, heroic, worthy and worshipful than contemporary actors. Be that as it may, 'tis certain that each one must live and do and dare *just where he stands*, whether it be an age of faith or of scepticism, of reason or of superstition, of political revolution or of public quiet—a stationary age or one of rapid and radical change. Whatever the cast and complexion of the time, obviously it is his "day" who is called to live through it. He is not responsible for its contents, moral climate and temperature, but only for the manner in which he carries himself and the impression he leaves behind him. Of course, there is a narrower sense in which one's day is the term of human life; it may be three score years and ten, it may be four score years; he may even attain to patriarchal longevity, become a century plant, or fall like a shock of corn fully ripe and laden with days and honors: or, he may scarcely fill out a generation. One man's life is like the long, mellow, sunny days of summer—with their protracted twilight; the type of another is the short, frosty winter day, when the sun rises late and sets early and one has but a few hasty hours before the shadows lengthen and night falls. In a

restricted sense, a man's day is his lifetime. There are these two definitions: one historical and considered in large relations—the state of human knowledge and affairs amid which he lives and moves; the other purely personal, physical, physiological, his life-limit—his bodily organism, its power of recuperation, the ratio of supply to waste, the excess of vitality over disintegrating forces. Now looking upon man on either of these sides, he has both “a day and a work.” Yet this is a truth that does not gain immediate, unchallenged access to the mind, because there are so many in the world of whom it would be hard to predicate any special use. This fact, however, does not annul the argument. For the question is not, what use men choose to make of themselves, but what they were designed for in the thought of the Maker. And the only conclusion compatible with the idea of a divine government, and of this world, as a moral system, is that there is a calling, an errand, a business of some kind, for rational creatures. If *design* be the true word and not chance; if Plato with his archetypes and ideas be our philosopher and not Democritus with his jostling, aimless atoms; if there be a living God and this be a moral system—then it seems to follow that creatures of intellect and conscience and a power of initiative, stepping upon this scene, should have something important to do: should find implicated with their constitution, written upon the walls of their nature, suggested by their place, in the scale of existence, disclosed by the character and range of their faculties, a supreme end, a clear intention, a final cause. Undoubtedly, it is easier to allow this in the case of some than of others. We do not experience much difficulty in regard to great, volitional, executive men; successful soldiers, organizing statesmen, world-makers and world-destroyers. Julius and Augustus Cæsar reformed the Roman administration and took their power from the corrupt and rapacious patricians. Richelieu, likewise, in his

day crushed the French nobility and set up a new and national policy. Bismarck created the Prussian Empire, and Cavour, Italian unity; Sir Robert Peel carried Catholic emancipation and free trade. It is not hard to see that men of masculine genius and doughty deeds have a "work" assigned them in the order of Providence. The same is true of the inspiration of poets, of philanthropists, of artists, of those who minister to the æsthetic and intellectual side of man's nature. It would probably be freely allowed that there was "a work" for Beethoven, for Michael Angelo, for Lord Bacon, for Kant, for any strong intellect or creative genius—working along his line—and who has shown how high the tide of speculative originality, of the analytic intellect, of constructive imagination, can rise in man. Now and again there have arisen "Providential" men who have covered a larger field and swung a heavier scythe than most; they have been distinguished workmen in the vast quarry of humanity, nobler builders on the slowly rising pile, who have not wrought for lucre—for pudding or praise—but have been indifferent to gain; who would think of Roger Bacon, Isaac Newton, Michael Faraday—as working for money? They were too great for that; they had a call, an ordination, a vision. So with poets whose cantos the world will not consent to forget, and artists who have wrought miracles of beauty with canvas and marble, and orators of resolution, and captains whose battles have altered the map of the world: such plainly have had what is called a "mission," a special errand. Their hymns are still sung, their epics are still read, their dramas are still acted, their names are still upon men's lips, their memories are still green; their sepulchres are shrines and their achievements imperishable. They seem to have been "sent;" they seem to have done a "work." An intelligible purpose, a formative idea, *an end* starts forth in sharp, luminous letters from their career. Personally defective and corrupt as they may

have been in some sort, they stand transfigured by the part they played, their incomparable services, and the powerful talent they exhibited. God, now and then, has dropped upon the earth mighty and capacious souls, individuals of energy, initiative, enterprise, charged with a special work; they did not necessarily know it—their public did not always know it—but posterity knows it. It shines clear and clearer, as the mists of prejudice and ignorance roll away—that these individuals stood on cardinal hinges, and that had they not acted as they did history would need to be rewritten in some of its dramatically critical and fascinating pages. Yea, verily, there have been those who have “subdued kingdoms, wrought righteousness, obtained promises, stopped the mouth of lions, quenched the violence of fire, escaped the edge of the sword, out of weakness they have been made strong, have waxed valiant in fight and have put to flight the armies of the aliens.” And, I say, it is not difficult to discern a logical thought underlying their life, an intelligible reason for their being. But when we come to consider the coarse and common herd of mankind, this conception of a divine purpose and a predestined “work” begins to suffer. Take men as they come, and it does not carry the appearance as though they had all been designedly sent hither, and as if each had something to do. Rather does it seem as if some had blundered into the wrong world—had alighted on the wrong planet and were trying, or failing, to make the best of a bad business. Yet, this is only superficial appearance, at least, if one holds to the ruling idea of a moral government, and is unwilling to deliver the universe to the reign of caprice. In that case we must believe that the poorest, meanest, most unproductive, sterile human life holds some high argument, answers a wise purpose, illustrates a fundamental truth, points a moral, or sounds a warning; stands, if for nothing else, than as a pillar of salt, a wreck on the beach, a typical example,

an awful prophecy of some immutable fact or law, or distinction in the universe. So that we cannot admit that there is any absolutely empty and meaningless human life in the world. If the disc of reason and the moral faculty has wheeled above the horizon in any one; if he know enough to be accountable, if he know better than he habitually does; if there be enough in him to take account of, then assuredly there is an underlying idea and purpose in that life—it illustrates a principle, a broad tendency, it incarnates a moral disposition—he has a “work.” If one is not playing the giant and working exultingly at the top of his bent, then he is a blind, sullen Samson, grinding in the Philistines’ mill; he is bound to do something. God has ordained that every responsible creature shall answer some moral end, shall preach a gospel of some kind. It may be from Sinai—a word of terror, of warning, of retribution; or it may sound from the placid sea of Galilee, and be rather a word of cheer, of hope, of consolation; but whichever it be, “no man liveth to himself;” he is “a spectacle to the world, to angels, and to men.” Every rational life on this planet radiates influence. Every man is monumental of some fact, some truth, some law. The meanest and most contemptible shows this much, at least: *how low a man can sink*. In all human experience look narrowly and you shall detect a ruling idea, a finality towards which it moves. ’Tis impossible to take the meaning out of human life. You cannot reduce it to dead letter and put it with hieroglyphs and Oriental symbolism, of which the world has lost the key. It was made to be an oracle; it is the channel of a revelation. Its eloquence may be mute, but is no less commanding: so that even the obstinate, obstructive, wrongheaded, cantankerous man, who stands up and proclaims his independence; that he will live under the sway of no obligation; that he will accept no master and no law; that he will take nothing as settled; that he will do as he pleases and suit him-

self—even *he* who “fears not God nor regards man”—that hard, brutal, cynical, terrible creature cannot prevent but that his character and bearing shall preach most powerfully to those who behold such a sorry spectacle. And so it runs throughout the scale of human diversities. The avaricious man is a monument of his infirmity. The sensualist is a monument of his animalism. The peevish, irritable, inflammable, passionate nature preaches unconsciously the value of self-mastery, the dignity of self-control. The rude, coarse, blunt, disagreeable person—the “sons of Belial” from whom one rarely receives a civil answer, or an act of accommodation or generosity—*these* too have a place, a function—not an enviable one; still they do a work. They at least put one upon thinking that, after all, the world is not such a bear garden as it might be—if by natural selection, only one bad type of disposition were propagated. I repeat, under the extant order of things, it is not possible for us to get out from under this inexorable necessity. Wittingly or unwittingly, directly or indirectly, we bear witness to some trait, tendency, instinct, that runs in our blood and is built into our bone. You must do something in this world, good or evil. If not by commission, then by omission; if not actively, then passively; if not deliberately, then inadvertently; if you do not assist then you retard. If we are not running with the footmen, then, mayhap, we are like bramble bushes, crying out from every spine and thorn, “Do not catch in me, else you will be torn;” or like quagmires, calling aloud, “Look out! do not slip on my treacherous edge, or you will be bemired and bespattered;” or like frogs, perchance, croaking dismally out of the rushes and the swamp, bidding men reflect what a terrible plight it is to squat down in marsh mud—a chronic grumbler; or like hissing serpents, shooting out malicious, poison-laden fangs at any one trying to do a good stroke of work or make a substantial addition to human knowledge and hap-

piness. Surely it is true, although at first sight not sustained by superficial appearance, that every human life has a sphere and significance ; God hides a secret in every man's nature ; He announces a serious proposition of some kind ; He asks a question ; He affixes an exclamation point. He hints at some important truth or duty. Each of us is a sculptor, carving a figure, a painter depicting a passion, a virtue, a fault, a prophet uttering an oracle. Now, then, if this be a valid interpretation, and men are thus representative of some idea, law, possibility ; it is highly material that it be one which has substantive value, moral elevation and real promise. What a magnificent attitude that of the Christ, "I must work the works of Him that sent me !" And while it is not given to the most devoted and conscientious, to the saintliest souls, to possess His peculiar consciousness, it is given to each of us to have an aim, a regulative purpose, that shall impart direction and momentum to life. It is quite possible for one to cherish a noble ambition and to live under the power of an ideal. *This* is the only style of life that can be properly so called. Any other is not living, it is merely *lasting*. It is the low life of the vegetable, of the clam, of the sponge, for the simple reason that it is devoid of moral purpose and is not consciously directed to a chief end. The only clause that can save one's life from deteriorating to the level of mere sentiency and instinct, and the lower platforms of being that shelve beneath us, *is just this*, that we may consciously and actively live for a purpose—one, too, lit up and inhabited by a divine thought. If this be not true then man is but a splendid animal ; it is only a question of degrees between him and the brute. *The moral purpose* is the one saving clause in our constitution. It is the only guarantee we possess of a future ; it is the star of our hope. And whoso lives without having dropped anchor by this continent of absolute morality and of religious ideas, is groping

his blind way along with the ox and the ass. He is living the sentient, spontaneous life; he has not seized his birth-right. A man without a lofty purpose in the world is afloat like the seaweed; he is a truncated cone; a dilapidated pyramid; a broken column; a fraction, not an integer; he lacks the differential characteristic of manhood. Physiologically, anatomically, intellectually in order he may be, but he wants the capstone; he has no great purpose, no good work. Men and Brethren, as you step across the threshold into a fresh untrodden beyond, impart into your life, if it be not already there, a divine element, a religious inspiration, something that smells like the flora of the heavenly country—like “the rose of Sharon.” Take up your life journey with a dash of that feeling which possessed Jesus Christ, when He said, “I have a work and I must do it.” It may not, in your judgment, be a great work; it may seem commonplace and unattractive; but it is capable of being transfigured by your handling. Its face may shine like that of Moses on the Mount. That depends upon the man himself, upon how he interprets it, what he imparts into it, what kind of chemist he is, and whether he knows the right ingredient and what will precipitate; whether he be enough of a prophet to discern in the forms and materials of the present the rudiments of a blessed future. All depends upon the temper of the individual. We can make the meanest work divine. We can find in it seeds, germs, bulbs, prophecies of good things to come. We can go out into life and carry ourselves in such a manner, handling its conditions and issues with such skill and fidelity, that they shall become a seed-plot of plethoric harvests. Carry into the thick of life a holy purpose. Like the naturalism of the old pagan world—only in a different sense—find God hidden everywhere. Learn to say with Jesus, “I must work the work of Him that sent me, while it is day.” A mortal man needs to be overshadowed by a sense of unseen things; by the eternal

presence ; it animates him, it propels him ; he has then something to live for ; there is an argument in his life ; he has points to carry ; he is at work on a problem ; he presses on to the "ergo"—the "q. e. d."—the theorem that was to be proved. This is the only virtue there is in human life ; these ideas of duty, of usefulness, of self-development, of progression, of spiritual integrity and excellence ; the idea of a supreme and worthy end—*this* is the whole of life. All the rest is mere firework, sheet-lightning, the hangings of the scene, painted tapestry, flapping curtains, upholstery ; *not* the plot, not the main interest. You must lead in a *transcendental* element to constitute a *real life*. "I must work the works of Him *that sent me*." A true human life is not possible without the super-physical, religious element ; without the great categories : God, duty, accountability. Otherwise it is sheer animalism, a blind groping about for acorns. Take this splendid, fruitful thought of Christ into your life—"a day," "a work," "a purpose," "a God." Find out what you have to do—find your work ; find what you can do best ; find your true vocation and aptitude and orbit ; because "the night cometh ;" not that this should unnerve and depress ; it did not alarm Jesus, and it need not affright any one who believes that "man is immortal till his work is done." *That* is the pinch, the stress of the problem ; your work, your life purpose, the character of your influence, the manifest disposition and desire—*these* are decisive, all the rest is incidental ; the coming twilight, disease, decrepitude, death ; these are merely circumstances, an episode, a feather from the wing of a soaring eagle in his upward flight. For forty centuries at least, man has had a history and a work on this planet. Doubtless he has been here longer ; but only during the historic period has he been of much account. For incalculable ages, it may be, he accomplished little or nothing worth a story or a song ; and how long he will stay—whether until the coal measures are exhausted and the

earth cools down to rock—*this* also is a secret thing. Nor does it greatly concern us. Let us rather live for our "day." Let us serve our own generation. Let us take hold of life just where we are inserted. We cannot save the great world of humanity. We cannot much help it. We cannot cure its sin and sorrow. We cannot clear up the mystery of evil or expound the universe, or tell the way that God will take. The distant future, the redemption of man, the final goal and justification of God's method in creation and providence; these are like nebulae sunken deep in space that have not taken shape and solidity: we need not try to resolve them. Harken rather to the words of Christ: "I must work the works of Him that sent me, *while it is day*." Be faithful to present opportunity. Live to-day—whatsoever thy hand findeth to do, do it. Stand for what you conceive to be the right, on all great questions. Many such have already been settled; but others will come up. New problems, new duties, new issues, new crises, will call for wisdom and valor and high conduct. The world is not yet finished; there will yet be magnificent opportunities to show your mettle and what stuff one is made of. Go forth, then; be valiant for the truth in the earth—know thy day. Who can tell but that he has been sent hither to do a work or to speak a word that shall glorify God and bless mankind!

ADDRESS BY THE HON. CUSHMAN K. DAVIS,

**Chairman of the United States Senate Committee on
Foreign Relations.***

MR. PROVOST, ALUMNI, OFFICERS, AND STUDENTS OF
THE UNIVERSITY OF PENNSYLVANIA:

The foreign relations of the United States have recently assumed increased importance. They have also become,

*Delivered before the General Alumni Society of the University at its Annual Luncheon on Alumni Day, June 12, 1900.

more than ever, the subject of popular concern and decision.

Various and complicated questions now present themselves so frequently that public thought, through every organ of its expression, is engaged upon them daily.

Formerly the conduct of these relations was reserved and occult. The mystery has, in these later years, been made almost entirely plain to everybody. The fact that the Senate is, by the Constitution, a part of the treaty-making power has, *evulgato imperii arcano*, revealed, by a process somewhat like that indicated by the terse phrase of Tacitus, at once the method and reasons of negotiations, and has subjected them to the influence of contemporary opinion. For our diplomacy is now controlled by public opinion. It formerly relied upon the power of the administration to coerce or persuade sanction after the diplomatic act had been done. This power has passed away.

It is, therefore, necessary to our welfare as a nation, in such an important department of its transactions, that this guiding and corrective power, this supervising authority, of which the most exalted public officer is but a transient delegate, should act with all the wisdom that can be imparted by the best advice and instruction.

The universities of this country are pre-eminently qualified to assist in the performance of these duties, and it is one of the most assuring facts of our time that the schools, and not only the professors and students, but also they who have graduated from them into the great university of life, are now impressing themselves so decisively upon the conduct of our international relations. This is as it should be.

The true end of learning is to bring its forces to bear immediately and continuously upon the concerns of social, industrial, business and political life. To do this was the conception of the reasoning imagination of Francis Bacon, who, having "taken all knowledge for his province," pre-

figured in his "New Atlantis" an institution which should give to human knowledge the power of present, continuous and permanent utility.

The schools were once important agents in the transaction of international affairs. The University of Bologna was the arbitrator of the disputes between the several Italian states and the Emperor Frederick Barbarossa. Philip III of France was guided by the University of Paris in his controversy with Pope Boniface VIII. Henry VIII took the decision of the English universities in the matter of his divorce from Queen Catherine; and William Pitt asked their opinion respecting the alleged conflict between the allegiance of the Catholics to the Pope and that claimed by their temporal sovereign. The cause which involved the validity of the sequestration by Napoleon of the debts due to the Elector of Hesse-Cassel was first tried by the University of Breslau. An appeal was taken from its decision to the University of Kiel, which affirmed the judgment. From that decision appeal was made to still another university, which, in a most learned opinion, reversed the judgment of the other schools.

The history of this institution suggests these observations. Benjamin Franklin was one of the founders and trustees of the University of Pennsylvania. In the power and variety of intellectual endowment he has been equaled by very few of the sons of men. He was a moralist, a craftsman, a physicist, an author, an inventor, a financier, an editor, a statesman, a philanthropist and a diplomatist. He was illustrious in each of these spheres of intellectual action. He was our envoy to France from 1776 to 1785. That vast, patient, calm intellect, by its diplomatic exertions, unquestionably secured the recognition of the independence of his country. He conducted the relations of the United States with France, and he dominated the conduct of our relations with the other European powers. The sword of Washington and the diplomacy of Frank-

lin raised the United States from the status of separate colonies to the station of one free, indivisible and independent nation. Acting thus together they achieved the noblest political result that has ever been accomplished "in all the tide of times."

All of the various faculties of Franklin, any one of which would be the full equipment of a man eminent in some special department, worked together in this stupendous task. He was the protagonist of American diplomacy and of our foreign relations. He succeeded: every obstacle he evaded or crushed; every adverse device of trained and subtle cunning he baffled, and brought to naught by his overmastering sagacity; and, in concluding his labors, he rose like the regnant and appeasing Divinity of the Sea, above the exasperated waves of passion, resentment and war, viewing a created and perpetual nation;

—et alto

Prospiciens, summa placidum caput extulit unda ;
 * * * * * *

Ille regit dictis animos, et pectora mulcet ;
 Sic cunctus pelagi cecidit fragor.

The faculty, students, and alumni of this University, and of all our schools, in the performance of their duties as citizens in everything that involves our international affairs, act under the ancestral and tutelary auspices of this consummate statesman, the greatest citizen of Pennsylvania, in whom was, for the first time, represented the personality of the United States in the imperial congregation of nations.

The foreign policy of this country has usually been of that formal character which consists in negotiating those conventions which maintain the peaceful intercourse of States. We have followed, with very few exceptions, the wise advice of Washington, not to involve ourselves in entangling alliances with European States; and to preserve our peculiar and powerful isolation from their political concerns has been the line upon which our foreign relations

have been conducted. We have been too remote, and our latent power has been too great, to be attacked, or even made the subject of serious diplomatic aggression by European States, singly or in combination. With the exception of our war against Mexico, our conduct towards the nations of the Western Hemisphere has been friendly and unselfish beyond any example in history. We have acquired, by purchase, territory on this continent larger in area than that which our fathers wrested from Great Britain by conquest. We paid Mexico for provinces which we could have taken from her as the legitimate and unremunerated spoil of war.

As to any expansion of our dominions, it has never been asserted by the most adverse critic of our institutions that the cause of civilization and human freedom would not be thereby promoted.

We have had no alliances with foreign powers excepting that with France, made in 1778, which we evaded ; that respecting Samoa with Great Britain and Germany, which was most providently terminated by the treaty of 1898 ; and the sterile and exasperating Clayton-Bulwer Convention of 1850, the result of a most indefensible and inexplicable negotiation, from which we ought to disengage ourselves in its entirety at the earliest possible moment. We have treaties with all the states of the world, but their basis and spirit are peace, commerce, and the guaranty of civil and religious rights. We broke through the wall of Chinese exclusion in many places. We threw open wide the ports of Japan, and gave the first impulse to that wonderful transformation of an Oriental despotism, most artificial and complicated in its feudalism, into a constitutional monarchy with legislative, executive and judicial departments in check and balance against each other. We have been the model and protective monitor of the Central and South American States, and, under our tutelage, they have advanced ; slowly it is true, but surely, towards sta-

bility. Under our example the British colonies to the north of us have become in substance a republic of almost perfect autonomy.

We have kept Europe and its monarchical institutions out of the American continents by the fiat of the Monroe Doctrine, which has been self-executing, except as to Mexico, at a time when all our powers were engrossed in a great civil war, but which was obeyed when that war ended.

It has sometimes happened that a nation has, all at once and from a precise and perceptible date, appeared for the first time, as by a summons, as a permanent actor in large and general international politics. England did so during the Protectorate of Cromwell; Russia did so during the reign of Peter the Great; Prussia did so in the last century; Japan has done so within the last thirty years.

For more than a century the United States was not an appreciable factor in the wars, the diplomacies, the expansions, the dismemberments and the revolutions of the other states of the world.

By an impulse providential or evolutionary, but irresistible, civilization has, during the present generation, moved all at once and in concert in a process of territorial expansion as sudden and inexplicable as that which, at the close of the fifteenth century, impelled the nations of Europe to voyages which resulted in the discovery and occupation of America. Within the last few years the continent of Africa has been subjected to European partition. China is now under dismemberment. Throughout this vast expansive process no foreign power seemed to think, nor indeed had it any need to think, of the United States. We were merely languid and willing spectators.

The war with Spain coincided with the widest industrial and commercial expansion that the United States has ever known. The policy of tariff protection bore its fruits: the ripening was quick, and the harvest was abundant beyond example. Our raw material and our manufactured prod-

ucts commanded every market. The American locomotive engine traversed Siberia ; an American bridge spanned the upper Nile ; American steel rails were laid in Burmah ; the waters of western Australia were conveyed to distant mines in pipes of American manufacture, and armored ships of war were built in our yards for Russia and Japan.

We became a creditor nation. We took up first our securities in payment of the balances due us ; we then received in money what was still due, and we became the great reservoir of gold ; our capitalists are lending money to Russia, and are buying the commercial paper and the public securities of Europe.

It is said that there can be heard in the hot growing time of summer in the vast fields of the West the crackling rustling murmur of the growth of the Indian corn ; and so with us, throughout the land are heard the forces and activities of industry, production, and exchange, blended in a monotone of joy and triumph.

Two naval victories in the war with Spain, as decisive as Salamis or Trafalgar, demonstrated that the United States had become a sea-power in fact. The skill of our officers, the marksmanship of our gunners, the bravery and fighting efficiency of our crews, the superb and faultless mechanism of our steel leviathans assured us, and convinced other nations, that the pastoral, farming, mechanical, mining giant of the Western world had become something more than he had seemed, and that he at last walked the rounds of national defence and honor "clad in complete steel."

I think it can be safely said that they who once threatened intervention between the United States and Spain abandoned that desire very quickly after the momentous events of Manila and Santiago, and will never again entertain the design of a similar intrusion under any circumstances that we can now imagine. I believe that these victories have done more to assure the peace of the world than

all of the alliances and international concerts which have been effected during the last fifty years.

The treaty of Paris extirpated Spain from her Asiatic and American insular possessions, and gave Porto Rico and the Philippine Archipelago to the United States.

And here we must pause to notice several coincidences, such as usually appear in similar epochal years of history. The coast territory of China has recently been occupied by European powers. Commerce, with an imperative voice, has demanded relations with one-fourth of the human race which, in its isolation from time immemorial, had sold much and bought little.

The partition of China thus began, and, while force was demanding entrance, a willingness was apparent on the part of the Chinese to enter into trade relations and to utilize, for the first time, many products of Western civilization. Concessions were made for the construction of railways and for mining iron and coal. A great demand was suddenly made for wheat by millions of the eaters of rice. Cotton, raw or of coarse fabric, began to go in large and increasing quantities from the Carolinas and Texas to China; American machinery found there a new market. San Francisco, Portland, Tacoma and Seattle received from the West an access of prosperity such as they had felt, in their beginnings, from the East. Alaska yielded up its hoards of frozen gold, and its icy solitudes became populous. It is certain that within twenty-five years our states on the Pacific Coast will contain fifteen millions of people.

It became apparent that the prophecy of Humboldt, made more than seventy-five years ago, that the greatest commerce of the world would in time be transacted upon the Pacific Ocean, was about to be fulfilled.

The subjection of China to full intercourse with Western civilization is the most stupendous secular event since the discovery of America by Columbus. The relations of the United States to the political organizations which will rule

or control the new conditions will be of transcendent importance. Civilization and national power are now advanced by commerce and not by war. War may give the first impulse, but it sets in operation peaceful forces which are mightier than armies, and to which armies and navies capitulate.

The United States will command the greatest part of the commerce with the Chinese Orient. We can produce every article that can be sold in this new and limitless market. To conduct that commerce we need to cross only one ocean; Europe must traverse the Atlantic, the Mediterranean, the Red Sea and the Pacific. Ancillary to this vantage of position on the American continent, we possess the Philippines, undoubtedly the richest of all the islands of the seas, flanking the coast of China for twelve hundred miles; Hawaii, and the insular extension of Alaska which impends over middle Asia, thus dominating southeastern Asia and the Asiatic Pacific Ocean.

The situation, thus imperfectly stated, introduced new elements into our foreign policy. The question was, what were to be the rights and status of the United States respecting trade and intercourse under these new conditions of partition, occupation and spheres of influence.

The action of Secretary Hay in the solution of this problem was diligent and wise. He stated to the great powers what was desired and expected by the United States, in notes of the same tenor to each government. These papers are models in every way. They declared that the United States "would be pleased to see" "each several government give formal assurance, and lend its co-operation in securing like assurances from other interested powers, that each within its respective sphere of whatever influence" would "give formal assurance"—

"First.—That they will in no way interfere with any treaty port or any vested interest within any so-called

‘sphere of interest’ or leased territory they may have in China.

“Second.—The Chinese treaty tariff of the time being shall apply to all merchandise landed or shipped to all such ports as are within said ‘sphere of interest’ (unless they be ‘free ports’), no matter to what nationality it may belong, and that duties so leviable shall be collected by the Chinese government.

“Third.—They will levy no higher harbor dues on vessels of another nationality frequenting any port in such ‘sphere’ than shall be levied on vessels of their own nationality, and no higher railroad charges over lines built, controlled, or operated within its ‘sphere’ on merchandise belonging to citizens or subjects of other nationalities transported through such ‘sphere’ than shall be levied on similar merchandise belonging to their own nationals transported over equal distances.”

These assurances were promptly and unreservedly given by Great Britain, Germany, Russia, France, Italy and Japan.

No diplomatic achievement in our history, excepting the treaty negotiated by Franklin by which our independence was acknowledged, and the conventions by which Louisiana and the Provinces of Mexico were acquired, can be placed before this negotiation. It did not expand our possession, but it will expand our influence and ascendancy immeasurably. It is the result, however, of the two expansions as to Louisiana and Mexico, and of the acquisition of the Philippines, Alaska, and Hawaii, without which the United States would have been the most remote from, instead of being as it is now, the nearest of all the nations to the great Asiatic market. These negotiations bound all the powers reciprocally to identity and equality of right and duty as to everything which can pertain to commerce and intercourse with China. The agreements are a

guaranty of peace in that part of the world where the conditions for war are most inflammable and beset the situation everywhere. Self-interest, national rivalry and pride, the greed for territorial acquisition, commercial covetousness, all conspired to make the situation extremely perilous. They were reconciled by the

Large discourse, looking before and after,

of the administration of President McKinley.

In the collisions of our internal politics, in the agitations and recriminations caused by the revolt in the Philippines and by events in Porto Rico and Cuba, the understanding and approval by the people of this great act of negotiation have been insufficient. Time and the hour will prove that Secretary Hay has, by this achievement in international policy, served not only the present interests of his country, but has also secured for it advantages which will be yielded with increasing benefits through a very long future.

The foreign relations of the United States are, in every respect, auspicious for peace. No portent is seen that can cause any reasonable fear of war. We were never more friendly with all nations than we are to-day. There is not now, and there never was, any secret alliance, compact or understanding between the United States and Great Britain. Germany does not purpose any enterprise in defiance of the Monroe Doctrine, nor is there any controversy between that empire and this government which, in the least degree, warrants the apprehension of anything more serious than vigorous and beneficent negotiations. Each state enacts its own economic and protective laws, and each state has the right to do so. These conflicting economic policies will, in due time, be brought to the minimum of conflict by wise and conciliatory diplomacy.

The American people did not begin or carry on the war with Spain for conquest of territory. But all great wars, waged for just causes, have always in their results gone

far beyond the first purposes and the control of those who began them. We are now attesting the invariable experience of all the ages of effort, strife, war and progressive humanity. These processes are always violent, but they are creative. Their secondary and executive incidents sometimes seem unjust. These are the collisions—

of right and wrong
Between whose endless jar Justice resides.

Why war should be a condition of national and human existence is an insoluble problem. But so it has ever been. It is that state of suffering by which nations and the human race have grown into civilization and the possession of liberty. It is the agonizing parturition by which national greatness and glory have been brought forth.

The sovereignty of the United States has been expanded immensely by the war with Spain. I believe that for this the American people were ordained. There need be no fear for the future. No administration will ever attempt, it will not be permitted by the controlling majesty of that people to attempt, to contract that sovereignty within the limits from which it has expanded, bearing with it all the imperial powers of righteous government, regenerating civilization and irreversible progress.

With all this the United States will, as always heretofore, stand for peace. It is as true of nations as it is of the smallest villages, or of two families, or of two men, that peace is secured by obedience to that precept of righteous selfishness—"mind your own business." We shall attend to our own affairs. We shall not entangle ourselves in the controversies of European States; nor, by any unfriendly act, intermeddle with that which does not concern us. Those states will fight to the utterance their own wars in their own way, and be judges for themselves of the causes for which those wars shall be waged.

The United States is the great armed Neutral of the

world. It will have peace, not as the boon of a suppliant non-combatant, but as the right of a peace-loving, armored, puissant nation whose rights are secured by its manifest ability to cause other nations to respect them.

HIGHER DEGREES CONFERRED AT COMMENCEMENT, 1900.

On Saturday, May 26, 1900, there was held in the Faculty Room at College Hall, the first formal session of the Faculty of Philosophy, before which the credentials of candidates for the higher degrees were presented.

Under the recent rules recommended by the Faculty, and approved by the Corporation last winter (in effect March 1, 1900), the oral examination hitherto required was abolished; and it was ordered that in its stead the entire Faculty of Philosophy should consider the credentials of every candidate, to decide, upon the evidence thus submitted, whether the candidate should be recommended for the higher degree. It was, however, provided that candidates who intended to proceed to their degrees at the close of the current year would be granted the privilege of electing whether they would proceed to their degrees under the new rules or under those in force at the time of their matriculation. All of the candidates for the degree of Master of Arts decided in favor of the new rules. Of the fifteen candidates for the degree of Doctor of Philosophy, the six following preferred to follow the provisions of the rules formerly in force:

BARCLAY WHITE BRADLEY, A. B. (Pennsylvania, 1897.)

Greek, Latin, Comparative Philology.

Thesis: "The Use of the Chorus in the Dialogue Portions of Sophocles."

FREDERIC ALBERT CLEVELAND, Ph. B. (De Pauw, 1890.)

Economics, Political Science, Finance.

Thesis: Statistical materials for four chapters of a work to be entitled, "History of Prices Since 1860."

JAMES EDWARD HAGERTY, A. B. (Indiana, 1892.)

Sociology, Economics, Political Science.

Thesis: "Recent Changes in the Marketing of Products in Their Effects upon Social Welfare."

- ORLANDO FAULKLAND LEWIS, A. B., A. M. (Tufts, 1895, 1897.)
Germanic Literature, Germanic Philology, English Philology.
Thesis: "History of German Drama in Philadelphia, Part I, Statistical."
- ALBERT EDWARD MCKINLEY, Ph. B. (Chicago, 1896.)
American Constitutional History, American History, Political Science.
Thesis: "Representation and the Suffrage in New Netherlands and New York, 1613 to 1691."
- CLAUDE HALSTEAD VAN TYNE, A. B. (Michigan, 1896.)
American History, European History, Political Science.
Thesis: "The Elimination of the Loyalists by Legal Enactments," chapters 8, 9 and 10 of a larger work to be entitled "Treatment of the Loyalists during the American Revolution."
- In conformity with the provisions above outlined the Faculty met, the Provost being in the chair. The following eleven candidates for the degree of Master of Arts were presented to the Faculty by the Dean, who in each case read a brief sketch of the candidate's academic life, certified that all the conditions prescribed by the statutes of the University and by the rules of the department had been fulfilled, and recommended the candidates for the degree of Master of Arts.
- MARY MAXWELL BLAINE, B. S. (Drury College, 1898.)
Mathematics, Physics.
- FRANK GOESS BOSSERT, A. B. (Pennsylvania, 1899.)
Philosophy, European History, Sociology.
- CHRISTIAN CARL CARSTENS, A. B. (Iowa College, 1891.)
Sociology, Economics, American History.
- DANIEL ERNEST MARTELL, A. B. (Pennsylvania, 1898.)
Romanic Languages, German.
- ALICE MADELEINE MCKELDEN, A. B. (Columbian University, 1899.)
Mathematics, Greek, Classical Philology.
- JOHN ALVIN ORR, A. B. (Cedarville College, 1895, and Pennsylvania, 1897.)
American History, English Literature, European History.
- MARY JANE ROSS, A. B. (Cornell, 1893.)
Zoölogy, Chemistry.
- EDWARD MITCHELL SPENCER, A. B. (Wesleyan, 1899.)
English Literature, English Philology, European History.
- HENRY WILSON STAHLNECKER, A. B. (Pennsylvania, 1899.)
Latin, Greek, Philosophy, English Literature.

EDWARD CHARLES WESSELHOEFT. (Graduate of schools of Hamburg, Germany.)

Germanics, Romanic Languages.

MILTON BIGLER WISE, A. B. (Pennsylvania, 1899.)

European History, Philosophy, Pedagogy.

After the credentials had been read, the candidates withdrew. The Dean moved that the Faculty recommend to the Board of Trustees for the degree of Master of Arts, the eleven persons whose credentials had been read. On motion, the Faculty unanimously voted "aye."

The following candidates for the degree of Doctor of Philosophy were then brought before the Faculty individually. Each one was presented to the Faculty by a member of the Group Committee under whose jurisdiction he had taken his major subject. The Presentor read a sketch of the candidate's academic life, including a certificate from the Dean that he had fulfilled all the conditions prescribed by the statutes of this University for the degree in question, and read also an outline of the scope and content of the thesis. The names of the candidates, together with their major and minor subjects, the title of the thesis, and the name of the Presentor, are as follows:

WILLIAM HARVEY ALLEN, A. B. (Chicago, 1897.)

Political Science, Economics, American History.

Thesis: "Rural Sanitary Administration in Pennsylvania."

Presentor, Assistant Professor ROWE.

MORTON GITHENS LLOYD, B. S. in E. E. (Pennsylvania, 1896.)

Physics, Mathematics, Chemistry.

Thesis: "The Transversal Thermo-magnetic Effect in Bismuth."

Presentor, Assistant Professor GOODSPEED.

JOHN DAMIEN MAGUIRE, A. B. (La Salle, 1886.)

Latin, Greek, Comparative Philology.

Thesis: "De Verborum in Livianis Orationibus Collocatione."

Presentor, Associate Professor GUDEMAN.

ANNA JANE MCKEAG, A. B. (Wilson College, 1895.)

Psychology, Philosophy, Philosophy.

Thesis: "The Sensation of Pain: an Experimental and Critical Analysis."

Presentor, Assistant Professor WITMER.

GEORGE WARD ROCKWELL, B. S. (Buchtel, 1898.)

Inorganic Chemistry, Organic Chemistry, Electro-Chemistry.

Thesis: "An Electrolytic Study of Pyroracemic Acid."

Presentor, Professor SMITH.

CHARLES LAWRENCE SARGENT, B. S. IN AGRICULTURE. (R. I. College of Agriculture and Mechanic Arts, 1894.)

Electro-Chemistry, Organic Chemistry, Inorganic Chemistry.

Thesis: "Alloys of Tungsten and of Molybdenum obtained in the Electric Furnace."

Presentor, Professor SMITH.

CHARLES HUGH SHAW, B. S. (Ohio Wesleyan, 1897.)

Botany, Zoölogy.

Thesis: "A Comparative Study of the Flowers of *Polygala polygama* and *P. pauciflora*, with a Discussion of Cleistogamy."

Presentor, Professor MACFARLANE.

LEWIS S. SHIMMELL (Graduate of Millersville State Normal School, 1877). Admitted to candidacy by special action of the Executive Committee, 1896.

American History, American Constitutional History, Pedagogy.

Thesis: "Border Warfare in Pennsylvania during the Revolution."

Presentor, Professor MCMASTER.

ALBERT DUNCAN YOCUM, Ph. B. (Dickinson, 1889.)

Pedagogy, Psychology, European History.

Thesis: "An Inquiry into the Fundamental Processes of Addition and Subtraction."

Presentor, Professor BRUMBAUGH.

In each case, after the credentials of the candidate had been read, the Provost inquired whether any member of the Faculty desired to ask further questions of the Presentor or of the candidate. The candidate then withdrew, and the Presentor made a formal motion to the effect that the Faculty recommend the candidate to the Board of Trustees for the degree of Doctor of Philosophy.

In each case, the Faculty unanimously voted "aye."

When all of the candidates had been presented, those for the degree of Master of Arts came before the Faculty in a body, and the Provost announced the decision. The same procedure was then followed with the candidates for the degree of Doctor of Philosophy. The Faculty then adjourned.

The credentials which were submitted to the Faculty in behalf of the nine candidates above mentioned are appended, printed in full.

It will be observed that the amount of resident work pursued by the candidates is expressed in terms of the "standard course." By this is meant the equivalent of one hour a week of lecture or seminary work for one year. All recommendations for the higher degrees must originate with the Group Committees under whose supervision the candidate has been pursuing his work. The Group Committee cannot recommend a candidate for the Master's degree who has not completed twelve standard courses, nor for the Doctor's degree one who has not completed twenty-four standard courses. The aim of this requirement is to ensure the candidate's having had in the first case, at least one, and in the second, at least two full academic years of resident work as a foundation for the private reading and research which, more especially in the case of the Doctor's degree, constitutes the more important part of his work. But no student can acquire the right to claim of his Group Committee recommendation for a higher degree by formal compliance with prescribed conditions. The decision of the Group Committee is reached only after an exhaustive consideration of all questions relating to the candidate's fitness for the degree in question.

Assistant Professor ROWE, Presentor.

May 26, 1900.

WILLIAM HARVEY ALLEN was born at Leroy, Minn., February 9, 1874. He received his early education in the public schools of Leroy, and in Carleton Academy. He entered the University of Chicago in 1894, as a Sophomore, and completed the work of three years in two. The year 1896-97 he spent as a student of Economics, Philosophy and History in the Universities of Berlin and Leipzig. He then returned to Chicago, taking the degree of Bachelor of Arts in 1897. He was a graduate student and Fellow at the University of Chicago, 1897-98, and was appointed Harrison Fellow in Political Science in this University for the year 1898-99. He entered the Department of Philosophy October 3, 1898, electing his major in Political Science and his minors in Economics and American History. He was reappointed to his Fellowship for the year 1899-1900. He has received credit for work done at other universities as follows: At the University of Leipzig, five and two-thirds standard courses in Economics and four in Political Science; at the University of Berlin, eight standard courses in Economics and one in Political Science; at the University of Chicago, eight standard courses in Economics and five and one-third in Political Science; a total of thirty-two standard courses pursued at other universities. At the University of Pennsylvania he has completed six standard courses in Political Science, six in Economics, and four in American History, making a total of forty-eight standard courses. He has passed written examinations in Political Science under Assistant Professor Rowe, on May 12; in Economics under Professor Patten, May 5; in American History under Dr. Ames and Professor McMaster, May 9 and 12. The results of these examinations have been in all respects satisfactory to the examiners.

Mr. Allen has presented a thesis entitled, "Rural Sanitary Administration in Pennsylvania," and has deposited a guarantee satisfactory to the Executive Committee for its ultimate printing. The scope of the thesis may be described as follows:

Mr. Allen's thesis is part of a larger investigation into the extension of power of sanitary authorities in the United States. It is a study in public administration, as well as an examination of sanitary problems. The main purpose which Mr. Allen has had in mind has been to examine the growth of our system of public administration, with a view to determining whether such administration has kept pace with the increasing complexity of our

social and economic conditions. After a general review of the present condition of sanitary administration in England and the United States, Mr. Allen takes up its development in Pennsylvania in the early colonial days, and traces the influence of increasing density of population upon the various problems affecting the public health. The relation between social and economic development on the one hand, and legal development on the other, is clearly shown in the growth of the doctrine of "common nuisance," in which the higher standard of life and the rising æsthetic demands of the community find expression.

The third chapter of the thesis deals with the introduction of State control. As population increased, the inconvenience and dangers resulting from exclusive local control became intolerable. As a result we find the introduction of central control, through the establishment of a State Board of Health. After a very thorough analysis of the work accomplished by this board, which is contained in Chapters III, IV and V, Mr. Allen makes several recommendations for change in the present organization. Of these the most important are as follows:

1. The reorganization of the State Board of Health, substituting salaried for volunteer members; the executive functions of the board to be vested in a Superintendent of Public Health. This change contemplates the substitution of an executive officer for the board system in the administration of the law. All deliberative and legislative functions to be assigned to the board composed of the following State officials: Chief Factory Inspector, Chief Mining Inspector, State Veterinarian, Pure Food Commissioner, Forestry Commissioner, Secretary of the Board of Charities and Asylums, and a Superintendent of Public Instruction.

2. The establishment of a State Bureau of Vital Statistics, responsible to the Board of Health.

3. Substitution of the county for the township and borough as units of sanitary administration.

4. The sanitary control over sources of water supply to be placed under the State Board of Health and its corps of inspectors.

Mr. Allen proposes to extend his investigations to other sections of the country for the purpose of comparative study.

Mr. Allen is unanimously recommended by Group Committee XI to the Faculty of Philosophy for the degree of Doctor of Philosophy.

[Signed] S. W. PATTEN,
Chairman of Group Committee XI.

W. R. NEWBOLD,
Dean.

Assistant Professor GOODSPEED, Presenter.

May 24, 1900.

MORTON GITHENS LLOYD was born at Beverly, New Jersey, September 10, 1874; received his early education in the public schools of Philadelphia, graduating from the Central Manual Training School, June, 1892. He entered the University of Pennsylvania as a Freshman, September, 1892, and graduated with the degree of Bachelor of Science in Electrical Engineering, 1896. He was appointed Hector Tyndale Fellow in Physics in June, 1896, being *ipso facto* admitted to candidacy for the degree of Doctor of Philosophy; was reappointed for the years 1897-98 and 1898-99, and held an instructorship in Physics in the College of the University of Pennsylvania for the year 1899-1900. He pursued graduate work in this University for the years 1896-97 and 1899-1900, at Harvard for the year 1897-98, and at the University of Berlin for the year 1898-99. He has elected his major in Physics, his minors in Mathematics and Chemistry, and has completed in these subjects thirty-eight (38) standard courses. He has passed written

examinations in Physics under Assistant Professor Goodspeed, on May 12, 1900, in Mathematics under Assistant Professor Schwatt, May 19, and in Chemistry under Professor Smith on May 23. The results of these examinations were in all respects satisfactory to the examiners.

Mr. Lloyd has presented a thesis entitled "The Transversal Thermomagnetic Effect in Bismuth," and has made a guarantee satisfactory to the Executive Committee for the printing of the thesis. The scope of the thesis may be outlined as follows:

This effect which the writer proposes to call the Nernst effect, after one of its discoverers, is an electro-motive force called forth in a metallic plate placed between the poles of a magnet, when its edges are kept at different temperatures. This electro-motive force is at right angles to the flow of heat and to the direction of the magnetic force. Three related phenomena,—the Hall effect, the galvano-magnetic difference of temperature, and the magnetic rotation of the isothermal lines, are discussed, and the influence of the last named on measurements of the Nernst effect pointed out. Bismuth was selected for experiment because the Nernst effect is large in it. Measurements were made to determine the relation between the Nernst effect and the strength of magnetic field producing it. The important result was obtained: that the Nernst effect varies proportionally to the change of electrical resistance of Bismuth in the magnetic field. The effect of the magnetic field upon resistance is known to increase greatly at low temperatures. The Nernst effect was in consequence also measured at low temperatures, liquid air and solid carbon dioxide being applied to this purpose, and a large increase in the effect was found by this means.

Mr. Lloyd is unanimously recommended by Group Committee XIV for the degree of Doctor of Philosophy.

[Signed] A. W. GOODSPEED,
Acting Chairman of Group Committee XIV.

W. R. NEWBOLD,
Dean.

Assistant Professor ALFRED GUDEMAN, Presentor.

May 24, 1900.

JOHN DAMIEN MAGUIRE was born in Philadelphia, March 3, 1868, and received his early education in the public schools of this city. He graduated from La Salle College with the degree of Bachelor of Arts in 1886. He was a student at Overbrook Seminary from 1886 to 1891, in Latin, Greek, English Literature, Philosophy, Mathematics and Theology; was a post-graduate student in Theology at the Catholic University of America, Washington, D. C., 1891 to 1894, receiving the degree of S. T. L. in 1894. He was a student of Philology at the University of Bonn in 1894-95, and at Johns Hopkins University, 1896 to 1898. He entered the University of Pennsylvania September 14, 1898, and was admitted to candidacy for the degree of Doctor of Philosophy, subject to certain conditions, on September 28, 1898. All these conditions were fulfilled prior to May 2, 1900. He elected his major in Latin, and his minors in Greek and Comparative Philology.

Mr. Maguire has received credit for his work at Johns Hopkins University as follows: In Latin, eight standard courses; in Comparative Philology, two standard courses; and for his work at the University of Pennsylvania, in Latin, eight standard courses; in Greek, six, and in Comparative Philology, three, a total of twenty-seven (27) standard courses. He has passed examinations in Latin under Associate Professor Gudeman, May 17, 1900; in Sanskrit and Comparative Philology under Professor Easton, May 19, 1900; and in Greek under Professor Lamberton, May 23, 1900. The results of these examinations were in all respects satisfactory to his examiners.

Mr. Maguire has presented to the Faculty a thesis entitled "*De Verborum in Livianis Orationibus Collocatione*," and has given a guarantee satisfactory to the Executive Committee for the printing of the thesis. The thesis deals with the rhetorical features of Livy's style, it being more in particular an analysis of the figures and the *collocatio verborum* of the speeches, with a view to determine what special purpose their employment subserves, and to what extent the devices of word order are responsible for the oratorical effect aimed at and accomplished. The speeches of Livy have hitherto not been subjected to this treatment, and hence no evidence in the direction pointed out was available. Mr. Maguire's careful collection and discussion have resulted in throwing considerable light upon the character and peculiarities of Livy's artistic methods; and the completed study will doubtless furnish still more interesting data for the differentiation of the style as revealed in Livy's speeches and the narrative proper, not to mention that the analysis may also help us to determine the question whether the author shows an appreciable development in his art from the earlier to the later speeches.

Mr. Maguire is unanimously recommended to the Faculty of Philosophy by Group Committee IV for the degree of Doctor of Philosophy.

[Signed] W. A. LAMBERTON,

Chairman of Group Committee IV.

W. R. NEWBOLD,

Dean.

Assistant Professor WITMER, Presenter.

May 24, 1900.

ANNA JANE McKEAG was born in Washington County, Penna., March 13, 1864; received her early education in the public schools of Washington County, and at the Washington Seminary. From 1881 to 1892 she taught in various public and private schools. From 1892 to 1894 she was Instructor in History and Rhetoric at Wilson College, Chambersburg, Penna., and from 1894 to date has been professor of the same subjects in that institution. While teaching in Wilson College she was also registered there as a student, receiving the degree of Bachelor of Arts in 1895. During the summers of 1896 and 1897 and the winter of 1897-98 she carried on work under the supervision of Assistant Professor Witmer in Psychology, without being registered as a graduate student, and for this she was allowed credit by the Executive Committee on March 21, 1899, to the extent of four standard courses. She was appointed Pepper Fellow in Psychology for the year 1898-99, and entered the Department September 30, 1899, electing Psychology as her major subject and her two minors in Philosophy. When appointed Fellow she was admitted to candidacy for the degree of Doctor of Philosophy. During the years 1898-99 and 1899-1900 she has completed twenty (20) standard courses, making a total of twenty-four (24). She has passed written examinations in Psychology under Assistant Professor Witmer on April 30 and May 1, 1900; with Dr. Singer in the Development of Science and in German Idealism, on May 20; and with Assistant Professor Newbold on May 14 and 15 in the Analysis of Experience and in the Metaphysics of Aristotle. The results of these examinations were in all respects satisfactory to the examiners.

Miss McKeag has presented a thesis entitled "*The Sensation of Pain: an Experimental and Critical Analysis*," for the printing of which she has deposited a guarantee satisfactory to the Executive Committee. The scope of this thesis embraces a consideration of the following problems as to the nature and physical basis of pain:

1. Is pain a sensation or a mode of feeling?
2. Are there pain nerves, spinal tracts for the conduction of pain stimuli, and cerebral "pain" centres?

3. Is the demonstration of specific "pain" nerves and centres necessary to the classification of pain as a sensation?

4. What is the physical and what the physiological stimulus of pain?

5. What is meant by the "psycho-physical" fact of pain, and wherein does the specificity of the pain process reside?

The thesis develops the "pain" problem from experimental data obtained in the Psychological Laboratory, and from a critical review of the development of theories of specific psycho-physical and psycho-physiological energies.

Group Committee VIII unanimously recommends Miss McKeag to the Faculty of Philosophy for the degree of Doctor of Philosophy.

[Signed] M. G. BRUMBAUGH,

Chairman of Group Committee VIII.

W. R. NEWBOLD,

Dean.

Professor SMITH, Presentor.

May 23, 1900.

GEORGE WARD ROCKWELL was born at Akron, Ohio, January 19, 1877; received his early education in the public schools of Akron, graduating from the High School in 1894. He entered Buchtel College as a freshman in 1894, receiving the degree of Bachelor of Science in 1898. He entered the University of Pennsylvania as a graduate student, October 3, 1898, electing his major in Inorganic Chemistry and his minors in Organic Chemistry and Electro-Chemistry. He was admitted to candidacy for the degree of Doctor of Philosophy, October 27, 1899.

He has completed under the jurisdiction of Group Committee XV approximately sixty (60) standard courses, of which twenty (20) were lecture courses and the remainder laboratory courses. He passed written examinations on May 10, 11, 12, 14, and 15, in Electro-Chemistry and Inorganic Chemistry under Professor Smith, in Physical Chemistry under Dr. Hardin, in Organic Chemistry under Dr. Lorenz, in Analytical Chemistry under Dr. Moyer, and in Industrial Chemistry under Dr. Shinn. The results of all the examinations were entirely satisfactory to the examiners.

He has presented a thesis entitled "An Electrolytic Study of Pyrouracemic Acid," which has been printed, and 250 copies will be delivered to the Dean before Commencement Day. The scope of this thesis may be briefly described as follows:

The application of the electric current in the study of organic compounds is comparatively new. Mr. Rockwell has studied both the action of electrolytic oxygen and of electrolytic hydrogen on pyrouracemic acid. In the first case he obtains acetaldehyde, acetic acid and acetic ether, and in the second he gets lactic acid. This investigation is a contribution in this new field of research. Great care has been given to the conditions under which the above products were obtained, as well as to the nature of the gases evolved in the oxidation.

The Group Committee unanimously recommends that Mr. Rockwell be recommended to the Board of Trustees for the degree of Doctor of Philosophy.

E. F. SMITH,

Chairman of Group Committee XV.

W. R. NEWBOLD,

Dean.

Professor SMITH, Presentor.

May 23, 1900.

CHARLES LAWRENCE SARGENT was born at Auburn, New York, July 27, 1874, and received his early education in the public schools of Leace Dale, R. I. He entered the Rhode Island College of Agriculture and Mechanic Arts as a Freshman in 1890, and received the degree of Bachelor of Science in Agriculture in 1894. For three years after graduation he was

second assistant chemist at the Rhode Island Agriculture Experiment Station, Kingston, R. I. In 1897 he entered the University of Michigan as a graduate student, pursuing work in Chemistry, and spent one year in that institution. He entered this University, September 29, 1898, electing his major in Electro-Chemistry and his minors in Organic Chemistry and Inorganic Chemistry. He was admitted to candidacy for the degree of Doctor of Philosophy, October 25, 1899. As a graduate student in this University he has completed approximately sixty (60) standard courses, of which twenty (20) were lecture courses and the remainder laboratory courses. He passed written examinations on May 10, 11, 12, 14, in Electro-Chemistry and Inorganic Chemistry under Professor Smith, in Organic Chemistry under Dr. Lorenz, in Physical Chemistry under Dr. Hardin, in Analytical Chemistry under Dr. Moyer, and in Industrial Chemistry under Dr. Shinn. The results of these examinations were entirely satisfactory.

He has presented a thesis entitled "Alloys of Tungsten and of Molybdenum Obtained in the Electric Furnace," which has been printed and 250 copies will be delivered to the Dean before Commencement Day. The scope of the thesis may be briefly described as follows:

The new alloys are those of tungsten with copper, with nickel, with cobalt, etc. Similar compounds with molybdenum are also made. Previous attempts to prepare these failed. Without the furnace they were impossible. It is also true that by this means Mr. Sargent has prepared pure columbium for the first time.

His electric furnace work is also a new field; our attempts are pioneer in character. What we have accomplished promises much for the future.

Mr. Sargent is unanimously recommended by Group Committee XV for the degree of Doctor of Philosophy.

W. R. NEWBOLD, Dean.	E. F. SMITH, Chairman of Group Committee XV.
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Professor MACFARLANE, President.

May 25, 1900

CHARLES HUGH SHAW was born in Delaware, Ohio, July 14, 1875. He received his early education in the public schools of Delaware, Ohio, graduating from the High School in 1891. He entered the Freshman Class of Ohio Wesleyan University in 1892, graduating with the degree of Bachelor of Science in 1897. From 1897-98 he was Professor of Biology in the Temple College, Philadelphia, and from 1898 to date has been Professor of Botany in the same institution. He entered the Department of Philosophy, September 29, 1897, electing his major in Botany and his minors in Botany and Zoölogy; he was admitted to candidacy for the degree of Doctor of Philosophy upon entrance. He has completed twenty-seven standard courses. He has passed written examinations in Botany under Professor Macfarlane and Dr. Harshberger, May 8, 9, 11 and 18; in Zoölogy under Professor Conklin on May 14 and 16. The results of these examinations were in all respects satisfactory to the examiners.

Mr. Shaw has presented a thesis entitled "A Comparative Study of the Flowers of *Polygala polygama* and *P. pauciflora*, with a Discussion of Cleistogamy," for the printing of which he has deposited a guarantee satisfactory to the Executive Committee. The scope of this thesis may be briefly outlined as follows:

(a) Resumé of previous knowledge of these flowers.

(b) Sketch of the distribution and habits of *P. polygama* and *P. pauciflora*, with especial reference to the structure and relation of the different types of flowers

(c) Detailed description of the microscopic structure of the floral organs in the purple and subterranean types of flower, and comparison of these with intermediate types of flower now described for the first time.

(d) A discussion of the relations of the floral types to their environmental conditions, and their bearing on questions of heredity.

(e) Historical sketch of published observations and views on cleistogamy, and their value in relation to the plants under discussion.

Mr. Shaw is unanimously recommended by Group Committee XVI for the degree of Doctor of Philosophy.

[Signed] JOHN M. MACFARLANE,
Chairman of Group Committee XVI.

W. R. NEWBOLD,
Dean.

Professor McMASTER, Presentor.

May 23, 1900.

LEWIS SHIMMELL was born in Bucks County, Penna., September 13, 1852, and received his early education in the public schools of Bucks County, graduating from the Millersville Normal School in 1875 and in 1877. He taught in various schools in Pennsylvania and Ohio from 1877 to 1894; was Superintendent of Schools of Huntingdon, 1884 to 1893; teacher of German in the Harrisburg High School, 1893 to 1897; of Civil Government and United States History, 1897 to date. He is the editor of the *School Gazette*, and author of "The Pennsylvania Citizen" and of "A Pennsylvania History."

Mr. Shimmell was admitted to the Department of Philosophy of the University of Pennsylvania, November 14, 1896, and was by special action of the Executive Committee, in recognition of his original work in American History, granted candidacy for the degree of Doctor of Philosophy, with his major in American History and his minors in American Constitutional History and Pedagogy. During the four years, 1896 to 1900, he has completed twenty-one (21) standard courses, and has prepared thirty-seven (37) special papers in American History and Pedagogy.

He has passed written examinations on May 2, in Pedagogy, under Professor Brumbaugh; on May 5, in American Constitutional History, under Dr. Ames; on May 19, in American History, under Professor McMaster. The results of these examinations were in all respects satisfactory to the examiners.

Mr. Shimmell has presented a thesis entitled "Border Warfare in Pennsylvania during the Revolution," and has given a guarantee satisfactory to the Executive Committee for its ultimate printing. The object of the thesis is to show that Indian opposition to the western movement of population,—an opposition which caused the Indian uprising, known as the Conspiracy of Pontiac, and Lord Dunmore's war of a late date,—was used by the British as the basis of an Indian alliance during the War for Independence. While the results of this alliance were felt on the frontiers of New York, Pennsylvania and Virginia, Mr. Shimmell confines his thesis to Pennsylvania, treating of the coming of the border war; the preparations of the frontiersmen to meet it; the Indian raids; the flight of the people eastward; the formation of the Battalion of Riflemen; the building of the frontier forts, and all the details of the long and desperate struggle which devastated Western Pennsylvania during ten years. All printed records, as well as all manuscript sources at Harrisburg, have been used and the subject exhaustively treated.

Mr. Shimmell is unanimously recommended to the Faculty of Philosophy by Group Committee IX for the degree of Doctor of Philosophy.

[Signed] JOHN BACH McMASTER,
Chairman of Group Committee IX.

W. R. NEWBOLD,
Dean.

Professor BRUMBAUGH, Presentor.

May 25, 1900.

ALBERT DUNCAN YOCUM was born at York, Penna., July 22, 1869; entered Dickinson College as a Freshman in 1885, receiving the degree of Ph. B., 1889. From 1889 to date he has been engaged in public school work, has been Supervisor of Schools at Millville, New Jersey, 1895 to 1900, and has recently been elected Superintendent of the Chester City Schools. He entered the Department of Philosophy, October 3, 1896, electing his major in Pedagogy and his minors in Psychology and European History; he was admitted to candidacy for the degree of Doctor of Philosophy upon entering. He has completed twenty-four (24) standard courses, and has passed written examinations in Pedagogy, under Professor Brumbaugh, on May 19; on May 19, in American History, under Professor McMaster. The results of these examinations were in all respects satisfactory to the examiners.

Mr. Yocum has presented a thesis entitled "An Inquiry into the Fundamental Processes of Addition and Subtraction," for the printing of which he has given a guarantee satisfactory to the Executive Committee. The scope of this thesis may be briefly outlined as follows:

Mr. Yocum endeavors to ascertain inductively the true order of teaching the most elementary facts of number to a child. The content of the child mind as regards number was investigated by experiments upon several hundred pupils when they first entered school. These experiments have led to the conclusion that the theories heretofore accepted are erroneous. The work of Dr. G. Stanley Hall, and of Superintendent Greenwood, of Kansas City, is reviewed and their statements disproved. An analysis of the logical order of numerical development and of the psychological order of mind content leads to the conclusion that the psychological order,—the true pedagogical order,—is not necessarily in conflict with the logical order of number development; that the processes may be purely pedagogical and at the same time logical.

The order of number presentation as taught by the Colburn and the Grube methods is shown, by exhaustive experiment for one year with large groups of children in school, to be fallacious; the fundamental concept of number in the child mind is found to be additive and not rational. The thesis concludes with a sketch of an elaborate and original method of teaching the fundamental processes of number.

Mr. Yocum is unanimously recommended to the Faculty of Philosophy by Group Committee VIII for the degree of Doctor of Philosophy.

[Signed] M. G. BRUMBAUGH,

Chairman of Group Committee VIII.

W. R. NEWBOLD,
Dean.

THE TOTAL ECLIPSE OF THE SUN.

The recent total eclipse of the sun, on May 28, was observed at Barnesville, Ga., by a party from the University of Pennsylvania, assisted by a number of volunteers. The point selected for mounting the instruments was a vacant lot in the rear of the "Magnolia Inn," the property of Mr. S. M. Marshburn, who generously placed his land at our disposal. A party from the U. S. Naval Observatory, under the direction of Professor

Updegraff, occupied an elaborately equipped station 3,700 feet north of east from our position.

Our principal instruments were a $4\frac{1}{2}$ inch equatorial telescope, a grating spectroscope, and a mean time chronometer. The telescope and spectroscope were mounted on posts, the position being determined by connection with the Government Station. For this purpose, the direction was determined by observation of *Polaris*, and the distance by direct measurement with a steel tape 100 feet in length. The complete reduction of the observations for latitude and longitude at the Naval Station will probably not be available for some weeks, but the result of a preliminary reduction kindly furnished by Mr. Hill is as follows:

Latitude $33^{\circ} 3' 25''$.

Longitude 5h. 36m. 36s. west of Greenwich.

The point occupied by our equatorial telescope we found to be $10.''3$ south and $2.8s$ west of the Government Station, making our position as follows:

Latitude, $33^{\circ} 3' 15''$.

Longitude, 5h. 36m. 38.8s west of Greenwich.

Though this depends on a preliminary reduction of the observations at the U. S. Naval Station, it is presumably quite accurate enough for present purposes.

The observations were entirely visual and were directed along the following lines:

Observation of time of contact.

Visual examination of the inner corona, with special reference to details of structure.

Spectroscopic investigation.

Sketching corona.

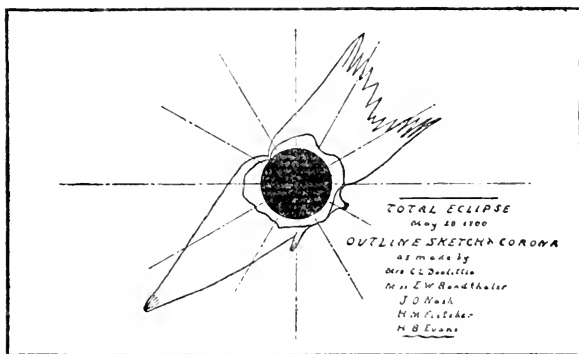
Visual and photographic observation of shadow bands.

Contacts.:—The observed Greenwich time of the four contacts were as follows, the chronometer correction being obtained by comparison with the signals received at the Government Station:

1st.	oh.	32m.	[6.9s].
2d.	1	38	31.2.
3d.	1	39	56.4.
4th.	2	55	57.7.

The contact had already occurred when the first time was recorded, the above value being several seconds late.

Visual Examination of the Inner Corona:—In considering the question as to how the telescope could be most profitably employed during the brief period of totality, it was decided to examine as carefully as time would permit, the delicate structure of the inner corona, particularly in the regions of the pole and of the prominences. In the polar regions the structural forms were very marked. They consisted of filaments radiating from the polar regions, quite narrow at the limb, and increasing in



width as the distance increased, arranged very symmetrically with respect to what was probably the exact position of the pole, and presenting a very beautiful appearance. To me they appeared perfectly straight, though some observers pronounced them curved. These streamers, or filaments, were more pronounced at the north than at the south pole.

A number of beautiful prominences, of a pale rose color, formed a conspicuous feature in the general view, but as these can be shown at any time, by the aid of the spectroscope, time could not then be spared for their examination. The question as to the structure of the corona in their vicinity, however, demanded some attention. This point has been brought out as a result of photographs of some recent eclipses, particularly that of last year, which appeared to show special structural

forms in the vicinity of these prominences. Although such peculiarities were looked for carefully on this occasion, nothing of the kind could be detected. It will therefore be a matter of some interest to see whether the photographs exhibit anything of this sort. The time available for this examination was lamentably brief, but it is hoped that it was employed to good advantage.

Spectroscopic Investigation :—A special interest in the spectroscopic observation of this eclipse grew out of a result derived from photographs of that which occurred in 1899.

At the time of the total eclipse of 1869, Professor Young found in the spectrum of the corona a characteristic line which he believed to be identical with the line known as 1474 of Kirchhoff's scale. As the line had not been identified with any known terrestrial element, it was assigned to a hypothetical element—coronium, which was presumed to be the principal constituent of the corona. Since 1869 the identity of this line with 1474 has hardly been called in question until a year ago, when Professor Campbell, of the Lick Observatory, found the position of the corona line different, by an easily measurable quantity, from that of 1474. It became therefore a matter of considerable interest at the first opportunity to determine carefully the position of this line, both by visual and photographic methods. There was no spectroscope at hand especially adapted to this investigation, but in view of the interesting nature of the subject it seemed worth the while to attack the problem with such means as were available. This investigation was undertaken by Mr. Edmund E. Read, of Camden, who employed a grating spectroscope made by Brashear, having collimator and view telescope of three-fourths of an inch aperture, and nine inches focal length. The grating was by Roland, and had 14,000 lines to the inch. Directly in front of the slit was placed the barrel of an ordinary opera glass, focused for an infinite distance. The instrument was equatorially mounted and was pointed directly towards the sun. The second order spectrum was employed, and was quite brilliant.

The micrometer threads were illuminated with an electric lamp, and were so placed as exactly to bisect line 1474, which was brought to the middle of the field. The slit was at first

extremely narrow, but was gradually opened. At the end of totality, the width was found to be one and one-half millimeters. No trace of the coronal line was seen at any time. There was a faint continuous spectrum, in which the green appeared less distinct than the other portions of the spectrum.

It was from the first an open question whether a grating would furnish sufficient light for this investigation, but it was hoped that such would be the case. The failure was less annoying when it was learned that others provided with much more powerful instruments had met with no better success.

Sketching Corona:—This work was carried out under the charge of Mr. Henry B. Evans, who was assisted by Mrs. C. L. Doolittle, Miss E. W. Rondthaler, of Bethlehem, Pa., Colonel J. O. Nash, and Professor H. M. Fletcher, of the Gordon Military Institute at Barnesville. The method of procedure was as follows: Mr. Evans made an outline sketch of the entire corona. Each of the four assistants was seated in such a position that a plumb line could be seen against the disc of the sun in order that the picture might be correctly oriented. The four quadrants formed by a vertical and horizontal line were assigned in succession to the four sketchers. As each individual was thus occupied with a limited region, more attention could be given to detail, and a corresponding degree of accuracy might be hoped for. Immediately after totality, and while the impression was still vivid, the five sketches were compiled into a single one, which, it is believed, shows the outline of the corona with reasonable accuracy.

The scientific value of such sketches may be to some extent an open question when the difficulties involved are considered. The image itself is vague and indefinite in outline, the time is very brief, and naturally each individual will see it somewhat differently from any other.

There are, however, practical difficulties which heretofore have made it next to impossible to obtain reliable photographs of the entire corona. If, for instance, the exposure is timed for the outer region, the interior parts, owing to the greater brightness, are burned out, and of course an exposure timed properly for the inner region is too brief to show anything of the outlying parts. Moreover, the distribution of visual and

actinic rays is probably not the same throughout ; so that if a perfect photograph were attainable it would probably not represent matters as seen. Both sketches and photographs, therefore, seem to be of importance, though a single sketch made by an individual may be only a crude picture of the object itself.

Shadow Bands.—There are bands, or fringes, alternately light and dark, which make their appearance on any light colored wall or screen immediately before and after totality. The width is said to vary from a few inches to three feet. They move rapidly, the direction varying with different eclipses; and usually those appearing at the close of totality have a direction different from those at the beginning. Their nature and origin is not fully understood, but they appear to be caused by waves in the earth's atmosphere, and therefore, are not of great importance. For the purpose of settling this question, however, carefully executed observations of the direction, velocity and distances between bands are important. A plan was devised by Mr. Edmund E. Read for photographing these bands, and was carried out under his direction by Mr. Oliver Smith, Jr., and Mrs. Read. A vertical screen was placed facing the sun, having attached a scale consisting of pieces of black tape which were sewed to the cloth at intervals of six and twelve inches. As the bands and scale would both appear on the photographs, an accurate determination of the spaces would be had both at the beginning and end of totality. The bands, however, proved to be extremely faint—so much so that photography was not successful. For the purpose of determining the direction of the bands, a platform 9 feet square was placed level upon the ground, and on this a sheet was tacked. The direction was marked by Mrs. Read by means of rods, and was found to be as follows:

Before totality: North 62° west.

After totality: North 17° west.

The motion across the sheet was at right angles to the above directions, but owing to faintness of the bands their velocity could not be determined. Mr. Oliver Smith, who was watching the corona with the naked eye at the end of totality,

reports that the inner region remained visible during ten seconds after totality had ceased.

Mercury was a very conspicuous object being only about sixteen hours from superior conjunction. Doubtless a number of fixed stars might have been seen had time been available for making the search.

Much has been said and written concerning the grandeur and beauty of this phenomenon, but only those whose privilege it was to witness the spectacle can form an adequate idea of its true character.

CHARLES L. DOOLITTLE.

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